AGRICULTURAL RESEARCH INSTITUTE
PUSA

TRANSACTIONS

OF THE

HIGHLAND AND AGRICULTURAL SOCIETY OF SCOTLAND.

PUBLISHED ANNUALLY.

1866—1867.

VOLUME I.

FOURTH SERIES.

ABERDEEN:
PRINTED AND PUBLISHED BY ARTHUR KING & CO.

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PRELIMINARY NOTICE.

It has been customary to prefix to each new volume of the Transactions a "*Preliminary Notice*," explanatory of the position of the Society and of its progress during the two years which have elapsed since the commencement of the preceding volume. On this occasion the Directors have not only to present a new volume, but the first of a new series, and a brief reference to the origin of the Transactions, and to the periods at which the various series have appeared, may not be inappropriate.

The first series commenced in 1799. It was published at intervals, and six volumes were brought out between that date and 1824. The second appeared in 1828, was published quarterly, and comprised eight volumes. The third commenced in 1843, and was also a quarterly publication; it was continued till 1865, when its eleventh volume was completed.

Since 1828, the Transactions were published by Messrs. Blackwood, and were sold to the members of the Society at a reduced price. A feeling, however, had long prevailed that the Society itself should undertake their publication, and issue them to members without charge. This desire the Directors now find themselves enabled to gratify, owing to the increased opulence of the Society, and it has accordingly been arranged that Reports, Premium-Books, Prize Essays, and other official documents, shall be printed and circulated annually, two numbers, or the Transactions for two years, forming a volume. This change will necessarily create a considerable increase of expenditure, but as it will be incurred to meet the generally expressed wish of the Society, the Directors hope that it will be regarded as a legitimate application of the funds.

With reference to the more immediate matter of a preliminary notice, viz., the position and progress of the Society in its various departments during the two last years, the Directors are gratified at being able to report satisfactorily.

MEMBERSHIP.

Notwithstanding the rapid increase in the numbers of the

Society for many years, the constituency is still being augmented, and the roll now contains the names of above 4,200 members.

FINANCE.

The accounts submitted to the last General Meeting exhibit at the close of the financial year on 30th November, 1865, assets amounting to £49,366, being an increase of £2,374 on the amount reported in the preliminary notice published in 1863.

GENERAL SHOWS.

The public continues to manifest unabated interest in these meetings. Since the date of the last notice, the Society has appeared at Kelso, Stirling, and Inverness. No show had been held at Kelso since 1832, Berwick having long been regarded as the central point for the south-eastern counties. The Directors, in deference to a local feeling in favour of Kelso, were induced to hold the meeting for 1863 there, and had no cause to regret having done so; for, notwithstanding the deficiency of accommodation in the town, and the inconvenience to which visitors were consequently subjected, the show was highly successful, and entailed but a trifling loss on the Society's funds.

Although one meeting, at a period so early as 1833, was held at Stirling, it may be regarded as an entirely new district, the counties of Stirling and Dumbarton having since that time been associated with Glasgow. After the meeting at Perth in 1861, a desire was expressed by many gentlemen connected with Stirlingshire that an intermediate district between Perth and Glasgow should be formed, with Stirling as the place of meeting, and the advantages of its admirable railway facilities and excellent hotel accommodation were urged; and, eventually, a guarantee of £1000 was offered, and a district was arranged, comprising the counties of Stirling, Dumbarton, and Clackmannan, and the western district of Perthshire. The result was a show in 1864, so successful as to warrant the Directors in regarding Stirling in future as one of the fixed points for the Society's meetings.

The Show at Inverness last year possessed all the elements of a successful meeting, but in a financial point of view it was unsatisfactory. At Stirling, the Society was exposed to no loss, and at Kelso the defalcation was trifling, while at Inverness it exceeded £400. To a certain extent this was anticipated, many circumstances occurring which make Inverness unavoidably the most expensive locality visited by the Society, and, in addition to these, the weather on the last occasion proved most unpropitious, seriously detracting from the collection at the show-yard gates.

The Directors are bound to acknowledge the liberality with which the Commissioners of Supply of all the Counties connected with the three last Shows, have contributed towards them by voluntary assessment on rental. This public mode of raising the necessary funds, has now entirely superseded the old system of private subscriptions, and obviates many disadvantages which attached to it. Assessment stamps the national and public character of the Society's Shows; it enables each Contributor to know the exact sum required from him, and by spreading the amount over all according to rental, the individual burden is comparatively light.

The Society was engaged to hold a Meeting at Glasgow this year, and at Aberdeen in 1867, but the prevalence of the Cattle Plague has rendered it necessary to defer both Shows for one year.

DISTRICT SHOWS.

It has been the aim of the Directors to extend the action of this department. It is one peculiar to the Society, distinguishing it, in some measure, from the National Societies of England and Ireland. Irrespective of the assistance it confers on local Associations, at times perhaps when their financial position requires such aid, it has gradually, and to a great extent, engrafted on these bodies the regulations and system of the Society, thus securing a uniformity of object and action over the country, which in itself is of great value. Another beneficial result is to be found in the friendly connexion and correspondence which local Shows necessarily create between the Central Society and the District Associations. During the last year the Society's Premiums, in one or another form, were offered to nearly 250 different parts of the country.

AGRICULTURAL EDUCATION.

Important alterations, affecting the curriculum of Study and the examination of Candidates for the Society's diploma. were recommended by the Council on Education in the following Report, which was adopted by the General Meeting in January, 1865. These alterations have since been embodied in Bye Laws which are now in force. (See page 275).

"REPORT BY COUNCIL ON EDUCATION AND COMMITTEE OF DIRECTORS.

"The Council and Committee have carefully considered how the Society can most effectually promote Agricultural Education, and they now beg to submit the following suggestions for the consideration of the Directors :—

"1. That the compulsory observance of a curriculum should be dispensed with, and that any course of study to be indicated should merely be suggestive and for the information of Students.

"2. That the rule which at present requires two separate periods of two years each to be devoted to classes and to the farm respectively should be repealed, and that no certificates of attendance at either be required.

"3. That the possession of the required knowledge shall be deemed a sufficient qualification for a Candidate, and that this should be determined solely by examination. That the Examination should be both written and oral; that the value of the answers should be determined by numbers; and that the oral examination should be public.

"4. That there should be two Examinations, to be styled respectively the Certificate Examination and the Diploma Examination. The first to be open to Candidates not less than eighteen years of age, the second to those who have completed twenty-one years.

"5. That to pass the Certificate Examination a Candidate must be acquainted with Farm Accounts, Mensuration, and Surveying, and must possess a good knowledge of Practical Agriculture, and a general acquaintance with the elements of Botany, Chemistry, and Natural History.

"6. That a Certificate in the following terms, signed by the President or Vice-President of the Council on Education, and by the Secretary, should be granted to Candidates passing this Examination:—'We hereby certify that A. B. has been examined, and has been found to possess a knowledge of Farm Accounts, Mensuration, and Surveying, a good knowledge of Practical Agriculture, and a general acquaintance with the elements of Botany, Chemistry, and Natural History, and that he is therefore entitled to present himself for the further examination, in terms of the regulations, for the Society's Diploma.'

"7. That Candidates who possess this certificate, and have completed their twenty-first year, should receive the diploma, if found, on the final examination, to possess a thorough knowledge of the theory and practice of Agriculture; of Mechanics and Mensuration; of the physiology and treatment of Domesticated Animals, and of the applications of Botany, Chemistry, and Natural History to Agriculture.

"8. That a sum not exceeding £100 per annum should be placed at the disposal of the examiners to be applied in prizes—the number and amount of which shall be afterwards fixed—to Candidates who pass with distinguished merit, and on a standard exceeding that required for the diploma.

"The Council and Committee believe that the modifications of the existing system now suggested will tend to popularise and extend the operation of the Society's Educational Charter, and to stimulate Agricultural Education. It is expected that the facilities afforded for preparation, and the prizes and marks of distinction proposed to be conferred, together with the publicity which will be attached to the awards, will have the effect of inducing provincial schools to devote attention to the education of agriculturists, and to vie with each other in qualifying pupils for such competitions.

"The Council and Committee recommend the Society to confine itself, at least for the present, to the exercise of such influence as has now been suggested. They cannot recommend the Society to establish direct relations with provincial or parochial schools. There are several objections to such a course. If prizes were to be offered, as has been suggested, to such schools, it would be difficult to regulate the number, or determine the status of the seminaries which would be entitled to claim them. Any attempt to draw a line of demarcation might appear invidious, and would be unpopular, and expose the Society to imputations of partiality. On the other hand, if no such line were fixed, the Society would, in all probability, find itself exposed to demands which could not be refused without giving offence, and which, if complied with, would encroach unreasonably on the resources of the Society. The offer of a prize involves likewise the necessity of an examination in each case, at the instance of the Society itself; and though the gratuitous and valuable co-operation of the learned professors and the other gentlemen who constitute the Board of Examiners, will enable the Society to conduct the proposed Certificate and Diploma Examinations in Edinburgh, the extension of a system of examination to the provinces would necessitate a staff far beyond that which it is in the power of the Society to organise. Other objections also might, if necessary, be stated against direct intervention in regard to the tuition given at parish schools and other local seminaries."

Since the date of the last Preliminary Notice, the Diploma has been conferred on—

William Brown, junior, Eddlestone, Peebles.
Arthur James Hill, 14, Camden Crescent, Bath.

CHEMICAL DEPARTMENT.

This department continues to be ably administered by Dr. Anderson. During the last two years many important subjects have been investigated in the laboratory, and reported in the Transactions, and others have been treated by the Professor in addresses delivered at the shows and winter meetings. After much consideration the Directors have resolved to introduce, in connection with this department, a new mode of obtaining reports of experiments in the field. These have hitherto been encouraged by means of premiums, and though much valuable information has thus been obtained, the system is open to several drawbacks. An experiment may be instituted in a locality not the most suitable for it; it may be conducted by several parties in the same district; or there may be a want of uniformity in the proceedings of different competitors. To obviate these disadvantages, it has been resolved to withdraw the premiums offered for experiments with manures, and to conduct these in certain selected districts, by means of persons specially appointed for the purpose. The most suitable districts, the most qualified parties, and a perfect uniformity of practice will thus be secured, and the comparative results be invested with a far higher value. A Committee, composed of gentlemen representing different parts of the country, will be organized to carry this system into operation, and powers will be conferred on them to lay out a certain amount annually in the purchase of manures, and in defraying other necessary expenses connected with the experiments.

VETERINARY COLLEGE.

THE VETERINARY COLLEGE continues to maintain its name, and to attract an increased attendance from all parts of the empire. A list of the students on whom the Society's veterinary diploma was conferred in 1864 and 1865 is annexed; and the Directors have, on behalf of the Society, to acknowledge the valuable assistance gratuitously given by the most distinguished members of the faculty of medicine in Edinburgh, and by the eminent veterinary practitioners who have jointly conducted the annual examination of the College, and whose names afford an ample guarantee for the sufficiency of the test applied, and for the qualifications of the gentlemen who have received the diploma:—

April, 1864.—William Frater, Hawksland, Lanarkshire; John Dickson, Dumfries; Joseph Callender, Falkirk; Robert Burnett, Glasgow; Alexander M'Dougall, Old Kilpatrick; John Milligan, Lockerbie; Edward H. Heard, Carrick-on-Suir; John Jack, Davidson's Mains, Edinburgh; John Smith, Ulverston; James Martin, Navan, Co. Meath; Alfred Challinor, Pendlebury, Manchester; William C. Lawson, Bolton; William Gould, Pendleton, Manchester; William Morris, Aberdeen; Benjamin M. Bisset, Brechin; David M'Lachlan, Paisley; Thomas Barker, Stokesley, Yorkshire; George W. Anderson, Rayne, Aberdeen; Frederick Danby, Holtly, Yorkshire; Hugh Jones, Carnarvonshire; David Rowlands, Denbighshire; Thomas Stokoe, Hay, Brecon; John H. Rhodes, Manchester; William Hall, Sedgefield, Durham; Thomas Simpson, Aberdeenshire; Arthur D. Dale, Lancashire; Harry Stone, Leicestershire.

April, 1865.—George Young, Haddington; James Mitchell, Kelso; Thomas Sharp, Hamilton; John Mitchell, Aberdeen; David Young, Hamilton; James G. Paton, Manchester; Thomas Kelburn, Skelton, Yorkshire; Andrew Mann, Lambton, Durham; R. W. Sloan, Kirkcudbright; Edward Perry, Leicestershire; Thos. Park, Edinburgh; Robert Moore, London; W. A. Smith, Dublin; William Dent, Westmoreland; W. G. Barker, Skelton, Yorkshire; A. Butters, Edinburgh; John Hammond, Newton-Stewart; Thomas M'Crorie, Monkton, Ayrshire; Alexander Lockhart, Glasgow; James Keith, Old Deer; Frederick Wall, Manchester.

MUSEUM.

When Government consented to establish in Edinburgh a Museum of Science and Art for Scotland, the Society was induced to transfer to that Institution its collection of Models of Agricultural Implements and Machinery; and the Museum has since been restricted to illustrations and examples of roots, seeds, straws, woods, and other articles of produce. The Museum of Science and Art being now completed, its great scope supersedes the necessity of maintaining many pre-existing Collections restricted to special departments, and it is desirable to direct public interest to it as far as possible. In this view the Museum has been entirely made over to and accepted by Government, and now forms a part of a public Institution. This has enabled the Directors to effect an economical and very convenient rearrangement. The house in Albyn Place has been sold, and the whole offices of the Society will be concentrated in George IV. Bridge.

OFFICE OF SECRETARY.

The principal event which has occurred during the past year in the internal management of the Society has been the resignation of Mr Hall Maxwell, who for twenty years has discharged the duties of secretary. The high sense which the Society entertains of the value of that gentleman's services cannot be better illustrated than by transferring to these pages the following extract from the minutes of the Directors, dated 20th September, 1865:—

"The Directors cannot accept Mr. Hall Maxwell's resignation without recording in their minutes the deep sense which they, in common with the members of the Society at large, entertain of the zeal, energy, and ability with which that gentleman has for twenty years discharged the duties of secretary. The progress which the Society has made, both financially and numerically, since Mr. Maxwell's appointment, and the increasing success which has attended the Society's annual shows under his administration, afford the best possible proofs of the efficient manner in which the office of secretary has been filled. None but those, however, who have been associated with Mr. Maxwell in the conduct of the Society's affairs can fully appreciate the great earnestness with which he uniformly applied his admirable business talents to the discharge of the multifarious duties of his office.

"The directors further resolve that, as a suitable and permanent memorial of the general approval by the Society of Mr. Hall Maxwell's services, he should be requested to consent to have his portrait executed, at the Society's expense, by an eminent artist, and that the picture, when completed, should be hung in the Society's hall."

This minute having been reported to the General Meeting of the Society on the 17th of January, 1866, was, on the motion of his Grace the Duke of Buccleuch, cordially and unanimously adopted as the resolution of the Society. It is highly honourable to Mr. Hall Maxwell to observe that a similar expression has been given in different districts of Scotland to the feelings entertained towards him by all classes of agriculturists.

The last meeting which he attended in his official capacity was held at Aberdeen on the 24th November, in reference to the Show to be held there in 1868. At that meeting it was moved from the chair by the Earl of Kintore, seconded by William M'Combie, Esq., Tillyfour, and unanimously resolved—

> "That this meeting, representing the various Agricultural Societies of the Counties of Aberdeen, Banff, and Kincardine, as well as the members of the Highland and Agricultural Society of this district, welcome among them the presence of Mr. Hall Maxwell—gratefully record their deep sense of the valuable services which, in the constant and faithful performance of his multifarious and often arduous and anxious duties, as Secretary of the Highland and Agricultural Society of Scotland, he has in that capacity for a period of over twenty years rendered to the progress and interest of agriculture—avail themselves of this fitting opportunity of expressing their special acknowledgments of Mr. Maxwell's great kindness and urbanity, and of his ever willing, prompt, and generous aid in furthering the objects and prosperity of the Associations—and their sincere trust that in now retiring from his hitherto active and responsible duties in the cause of agricultural advancement, Mr. Maxwell may for many years enjoy every comfort and happiness."

It may also be mentioned that in grateful appreciation of the zeal, energy, ability, and success with which he has discharged the duties of Secretary, Mr. Hall Maxwell has been presented by no fewer than 830 Members of the Society, with several valuable articles of plate and a purse of a Thousand Sovereigns.

At a Meeting of the Directors of the Society, held on the 1st of November, 1865, Alexander Macduff, Esq. of Bonhard, was elected to the office of Secretary, and this election was in terms of the Charter approved by the General Meeting on the 17th of January.

STATE OF THE FUNDS

OF

THE HIGHLAND AND AGRICULTURAL SOCIETY,

At 30th November, 1865.

I. INVESTMENTS—			
1. Heritable Bond, ...	£9,500	0	0
2. Bank Stock—present Value, . . .	24,488	14	0
3. Railway Debentures, ...	4,570	0	0
4. Glasgow Water Corporation Debenture, .	1,000	0	0
5. Ten Shares, or £500, of the British Fishery Society, ...	200	0	0
	£39,758	14	0
II. HERITABLE PROPERTY, per Valuation . . .	7,037	18	5
III. BALANCE IN ROYAL BANK, ...	2,169	16	2
IV. MEDALS ON HAND, ...	29	4	0
V. ARREARS OF MEMBERS' SUBSCRIPTIONS CONSIDERED RECOVERABLE, ...	321	5	6
VI. ARREARS APPLICABLE TO INVERNESS SHOW, 1865, .	49	2	5
	£49,366	0	6

KENNETH MACKENZIE, *Auditor.*

ABSTRACT of the ACCOUNTS of the HIGHLAND and

CHARGE.

1. Balance in the Royal Bank of Scotland at 30th Nov., 1864, ...			£2,284 10 6
2. Sum in Deposit-Receipt at do., waiting investment, ...			416 18 0
3. Medals on hand at do., ...			42 2 0
4. Arrears of Annual Subscriptions at do. considered recoverable,		£257 0 0	
Whereof due by Members compounding for Life, and thereby extinguished, ...		21 4 6	
			235 15 6
5. Interest and Dividends—			
1. Interest—			
On £9,500 lent on Heritable Security, ...		£372 8 6	
On £5,570 lent on Debenture Bonds, ...		218 15 5	
On Bank Account, ...		42 7 6	
On £416 18s. in Deposit-Receipt, waiting investment, ...		3 0 4	
		£636 11 9	
2. Dividends—			
On £12,420 14s. 1d. of Bank Stocks (the value of which at 30th November, 1865, was £34,488 14s.),	£1,113 18 2		
On £500 Stock of British Fishery Society,	20 0 0		
		1,133 18 2	
			1,770 9 11
6. Annual Subscriptions for the year, ...			951 15 6
7. Life Subscriptions, ...			1,007 13 0
8. Chemical Department,—Subscriptions, ...			108 7 6
9. Local Competitions—Subscriptions in aid of, ...			52 0 0
10. Receipts on account of former Shows—			
Stirling Show—Entry Money, &c., ...		£9 16 0	
Kelso Show—Balance of Subscription from Peeblesshire,		1 17 4	
			11 13 4
11. Inverness Show—Receipts per Abstract, ...			2,812 7 6

AGRICULTURAL SOCIETY of SCOTLAND for the year 1864-65.

DISCHARGE.

	£	s.	d.	£	s.	d.
1. ESTABLISHMENT—						
1. Secretary's Salary,				£500	0	0
2. Allowance for Heating, Cleaning, and Service,				83	5	0
3. Auditor's Fee,				30	0	0
4. Allowance to Editor of "Transactions,"				21	0	0
5. Clerks' Salaries,				183	11	0
6. Allowance to Curator of Machinery,				10	0	0
7. Feu-Duty, Taxes, Repairs, &c.,						
Feu-Duty,	£36	16	7			
Taxes,	35	1	6			
Insurance,	4	2	4			
Water-Duty,	6	3	4			
Repairs,	35	16	11			
				118	0	8
8. Income Tax on Interest,				0	7	9
				£946	4	5
Less Commission received on Renewal of Bond for £450 by Scottish North-Eastern Railway Company,				2	5	0
				£943	19	5
2. CHEMICAL DEPARTMENT—Salary to Professor Anderson,				300	0	0
3. VETERINARY DEPARTMENT—						
1. Allowance to Professor Dick,	£26	5	0			
2. Medals awarded to Students,	6	8	0			
3. Advertising,	8	4	9			
				40	17	9
4. MUSEUM—						
1. Mr. Gourlay Steell for Painting of Stallion and Bull,	£55	0	0			
2. Feu-Duty, Taxes, Water-Duty, Gas, and Insurance,	60	10	0			
3. Repairs,	13	19	7			
4. Wages to Porter,	41	5	0			
5. Coals,	8	2	6			
				178	17	1
5. PREMIUMS PAID—						
1. Kelso Show, 1863,	£15	0	0			
2. Stirling Show, 1864,	436	0	3			
3. Inverness Show, 1865,	1,098	0	3			
4. District Competitions, 1864,	755	0	0			
5. Ploughing Competitions—Medals awarded,	94	5	0			
6. Essays and Reports,	110	0	0			
7. Class of Agriculture—Prizes awarded,	10	0	0			
				2,518	5	6
6. PRINTING, ADVERTISING, AND STATIONERY—						
1. Printing,	£123	4	0			
2. Advertising,	17	11	3			
3. Stationery,	25	15	0			
				166	10	3
7. POSTAGE AND RECEIPT STAMPS,				58	10	0
8. OLD AND REMARKABLE TREES,—Printing Returns, &c.,				23	14	0
9. TRAVELLING—						
1. Secretary's Expenses to Inverness, Glasgow, Aberdeen, &c.,	£25	16	10			
2. Messrs. Harvey and Guthrie to inspect Crops in Ayrshire and East Lothian,	4	15	0			
				30	11	10
10. CATTLE PLAGUE—Professor Dick for Travelling Expenses to London, and Fee,				23	5	0
11. MISCELLANEOUS—						
1. Subscription to Meteorological Society,	£5	0	0			
2. Reporting General Meetings,	3	3	0			
3. Trials of Ploughs, &c.—Mr. Slight's Travelling Expenses and Fee,	5	15	6			
4. Bank Charges, Incidental Outlays, &c.,	4	3	8			
5. Business Accounts,	7	3	7			
				25	5	9
12. STIRLING SHOW, 1864—						
Rent of Banquet Hall, Travelling Expenses of a Judge, &c.,				10	10	6
13. PRICE OF £350 STOCK of National Bank, at £217,	£759	10	0			
Stamps, Fees, &c.,	6	18	0			
				766	8	0
14. INVERNESS SHOW, 1865—Expenses per Abstract,				1,978	12	1
15. INVERNESS SHOW, 1865—						
Subscriptions outstanding,	£10	0	0			
Rent of Refreshment-Room, still due,	30	0	0			
Balance due by Society's Agent at Inverness,	9	2	5			
				49	2	5
16. BALANCE in Bank at 30th November, 1865,				2,169	16	2
17. MEDALS on hand at do.,				29	4	0
18. ARREARS OF SUBSCRIPTIONS—						
1. Recoverable Arrears,	£321	5	6			
2. Irrecoverable, and written off,	63	17	6			
				385	3	0
				£9,698	12	9

W. S. WALKER, *Member of Finance Committee.*
WELLWOOD H. MAXWELL, *Member of Finance Committee.*
KENNETH MACKENZIE, C.A., *Auditor.*

INVERNESS SHOW, 1865.—ABSTRACT OF ACCOUNTS.

RECEIPTS.

1. LOCAL SUBSCRIPTIONS—		
1. Inverness-shire—Voluntary Assessment on Proprietors,		£437 9 2
2. " General Subscription, ...		18 1 6
3. Morayshire—Voluntary Assessment on Proprietors, ...		209 16 9
4. Ross-shire— Do. do., ...		267 13 11
5. " General Subscription, ...		49 9 0
6. Caithness-shire—Voluntary Subscription on Proprietors,		88 0 0
7. " General Subscription, ...		19 2 11
8 Sutherlandshire—Voluntary Assessment on Proprietors,		60 0 0
9. Nairnshire— Do. do.,		60 0 0
10. " General Subscription, ...		11 16 6
11. Local Societies—Inverness Farmers' Society, ...		50 0 0
" " Morayshire Farmers' Club, ...		80 0 0
" " Wester Ross Farmers' Club, ...		30 0 0
" " Ross-shire Pastoral Society, ...		10 0 0
" " Caithness Farmers' Society, ...		20 0 0
" " Sutherland Farmers' Club, ...		15 0 0
" " Nairnshire Farming Society, ...		10 0 0
" " Badenoch and Rothiemurchus Society,		4 19 6
		£1,441 9 3
2. AMOUNT COLLECTED DURING SHOW—		
1. Drawn at Gates, ...	£836 9 7	
2. By Sale of Catalogues and Awards, ...	84 9 8	
		920 19 3
3. ENTRY MONEY—		
1. On Stock, ...	£29 16 6	
2. On Implements, ...	18 4 0	
		48 0 6
4. RENT OF STALLS AND SHEDDING—		
1. Rent of Stalls, ...	£270 3 0	
2. Implement Shedding, ...	57 0 6	
3. Servants' Accommodation, ...	25 0 0	
		352 3 6
5. RENTS OF REFRESHMENT ROOMS, ...		45 0 0
6. INTEREST FROM BANK, ...		4 15 0
7. BALANCE,*		259 4 10
		£3,071 12 4

* In addition to the Balance of	£259 4 10
There are the Premiums undrawn at 30th November,	151 0 0
Probable Deficiency on Show, ...	410 4 10

EDINBURGH, 3rd *January*, 1866.

PAYMENTS.

1. PREMIUMS drawn at 30th November, 1865, ...		£1,093 0 3
2. SHOW YARD—		
Fitting up Show-yard, ...	£1,274 10 0	
Bedding for Stock, &c., ...	39 18 5	
Water, Fountains, Closets, and Troughs, ...	20 10 0	
Zinc Tickets, Boards, and Carriages, ...	8 17 11	
Miscellaneous Expenditure, ...	6 11 6	
		1,350 7 10
3. POLICE FORCE, ...		14 14 0
4. TRAVELLING EXPENSES of Judges, Secretary, Clerks, &c., ...		86 17 6
5. HOTEL AND OTHER BILLS for Judges, Deputation, Secretary, &c.,		155 13 8
6. TICKETS TO BANQUET for Judges and Staff, ...		19 2 6
7. BALANCE on Banquet Account, ...		5 0 9
8. PRINTING—		
1. Catalogues, ...	£71 16 0	
2. List of Awards, ...	9 1 0	
3. Placards, ...	25 0 0	
4. Premium Lists, Certificates, Circulars, &c., ...	41 4 0	
5. Members' Tickets, ...	3 15 0	
		150 16 0
9. ADVERTISING—		
1. At Railway Stations, ...	£20 0 0	
2. In Newspapers, ...	40 3 6	
		60 3 6
10. ALLOWANCE to Society's Agent at Inverness, ...		21 0 0
11. ALLOWANCE to Curator of Machinery, ...		12 12 0
12. ALLOWANCE to Veterinary Inspector, ...		6 6 0
13. CLERKS, ...		29 0 0
14. ASSISTANTS, Porters, and Attendants, ...		22 14 2
15. POSTAGE ACCOUNT, ...		27 10 0
16. STATIONERY, ...		1 11 0
17. CARRIAGE of Catalogues, Papers, &c., ...		4 2 3
18. MISCELLANEOUS EXPENDITURE, including Bank and Post-office Charges, Telegrams, Omnibuses, &c., ...		11 1 9
		£3,071 12 4

W. S. WALKER, *Member of Finance Committee.*
WELLWOOD H. MAXWELL, *Member of Finance Committee.*
KENNETH MACKENZIE, C.A., *Auditor.*

STATE OF THE FUNDS

OF

THE HIGHLAND AND AGRICULTURAL SOCIETY,

At 30th November, 1866

I. INVESTMENTS—			
1. Heritable Bond, ...	£9,500	0	0
2. Bank Stock—present Value, .	25,061	15	2
3. Railway Debentures, ...	8,570	0	0
4. Glasgow Water Corporation Debenture, .	1,000	0	0
5. Ten Shares, or £500, of the British Fishery Society, ...	200	0	0
	£44,331	15	2
II. HERITABLE PROPERTY AT GEORGE IV. BRIDGE, per Valuation by Messrs. John Watherston & Sons, ...	3,100	0	0
III. FURNITURE, BOOKS, AND PAINTINGS, ...	1,000	0	0
IV. BALANCE IN ROYAL BANK OF SCOTLAND, . .	1,065	14	3
V. MEDALS ON HAND, ...	23	15	0
VI. ARREARS OF MEMBERS' SUBSCRIPTIONS CONSIDERED RECOVERABLE, ...	249	15	6
VII. ARREARS APPLICABLE TO INVERNESS SHOW, 1865, .	10	0	0
	£49,780	19	11

KENNETH MACKENZIE, *Auditor.*

ABSTRACT of the ACCOUNTS of the HIGHLAND and

CHARGE.

1. Balance in Royal Bank of Scotland in favour of the Society at 30th Nov., 1865,			£2,169 16 2
2. Arrears of Annual Subscriptions at do., considered recoverable,		£321 5 6	
Whereof due by Members compounding for Life and thereby extinguished, ...		42 9 6	
			278 16 0
3. Medals on hand at do.			29 4 0
4. Inverness Show, sums outstanding at do., ...		£49 2 5	
Sum written off as irrecoverable, part of Rent of Refreshment Rooms, ...		6 9 6	
			42 12 11
5. Interest and Dividends—			
1. Interest—			
On £9,500 lent on Heritable Security, ...		£397 0 5	
On £8,570 lent on Debenture Bonds, ...		286 11 4	
On Bank Account, ...		62 1 11	
		£745 13 8	
2. Dividends—			
On £12,420 14s 1d. of Bank Stock (the value of which at 30th November, 1866, was £23,061 15s. 2d.), ...	£1200 2 5		
On £500 Stock British Fishery Society ...	20 0 0		
		1,220 2 5	
			1,965 16 1
6. Annual Subscriptions, ...			897 14 0
7. Life Subscriptions, ...			454 3 0
8. Chemical Department—Subscriptions, ...			104 17 0
9. Local Competitions—Subscriptions in aid, ...			19 0 0
10. Receipts on account of Inverness Show, ...			14 14 0
11. Price of House, No. 6, Albyn Place, ...			3,400 0 0
			£9,376 14 2

Edinburgh, 7th January, 1867.

AGRICULTURAL SOCIETY of SCOTLAND for the year 1865-66.

DISCHARGE.

1. ESTABLISHMENT EXPENSES—		
1. Salary to Secretary—		
To John Hall Maxwell, Esq., C.B., the late Secretary, for Salary and Allowances to Whitsunday, 1866		£291 12 6
To Fletcher Norton Menzies, Esq., the present Secretary, for half-year to 11th November, 1866		350 0 0
		£641 12 6
2. Service and Attendance in Office		32 10 0
3. Fee to Auditor of Accounts for year 1864-65		30 0 0
4. Clerks' Salaries		216 18 0
5. Allowance to Curator of Machinery		10 0 0
6. Feu-Duty, Taxes, &c., 6, Albyn Place		76 0 2
7. Hall, &c., No. 3, George IV. Bridge—		
1. Feu-Duty, Taxes, Water-Duty, and Insurance ...	£84 10 3	
2. Repairs	30 4 6	
3. Wages to Porter for five months, and Handsel ...	15 15 0	
4. Coals	7 10 0	
		137 19 9
		£1145 0 5
2. CHEMICAL DEPARTMENT—Salary to Professor Anderson		300 0 0
3. VETERINARY DEPARTMENT		86 0 0
4. ALTERING AND FURNISHING OFFICES No. 3, GEORGE IV. BRIDGE		944 0 9
5. PORTRAIT of John Hall Maxwell, C.B., by Mr. Gourlay Steell, ...		250 0 0
6. PREMIUMS PAID—		
1. Inverness Show, 1865	£156 15 0	
2. District Competitions, 1865	345 2 0	
3. Ploughing Competitions—Medals awarded	70 4 0	
4. Essays and Reports	107 14 0	
5. Gold Medal to J. Dyce Nicol, Esq. of Ballogie, M.P., for Agricultural Cottages	10 0 0	
6. Class of Agriculture—Prizes awarded	10 0 0	
		699 15 0
7. PRINTING, ADVERTISING, AND STATIONERY		171 11 1
8. POSTAGE AND RECEIPT STAMPS		47 0 0
9. TRAVELLING—		
1. Secretary's Expenses	£5 6 0	
2. Expenses of Dr. Rankine to examination	0 15 0	
		6 1 0
10. MISCELLANEOUS—		
1. Subscription to Meteorological Society	£5 0 0	
2. Reporting General Meetings	3 3 0	
3. Bank Charges and Incidental Outlays	10 9 7	
	£18 12 7	
Deduct Balance of a Life Subscription received ...	0 5 0	
		18 7 7
11. BUSINESS ACCOUNTS in connection with Sale of House, No. 6, Albyn Place, recovering Subscriptions, and Rent of Refreshment Rooms, Inverness	£69 16 7	
Deduct Commission received from Caledonian Railway Company on Loan for £3000	15 0 0	
		54 16 7
12. INVERNESS SHOW, 1865—		
Account for Refreshments, Travelling Expenses of Mr. Nicol Milne, &c. ...		18 15 6
13. TRANSACTIONS—		
1. To Arthur King & Co. for Printing Society's Transactions	£155 11 8	
2. To do. for Postage of Transactions ...	59 4 0	
	£214 15 8	
Copy of Society's Transactions sold	0 2 6	
		214 13 2
14. TRIALS OF STEAM CULTIVATORS AND THRASHING MILL—		
Expenses of Committee in attending trials	£13 18 10	
Fees to Mr. Slight and his Travelling Expenses ...	10 5 0	
		24 3 10
15. SUM invested in Debenture with Edinburgh and Bathgate Railway Company		1000 0 0
16. SUM invested in Debenture with Caledonian Railway Company		3000 0 0
17. INVERNESS SHOW—Subscription due by the Ross-shire Pastoral Society ...		10 0 0
18. BALANCE in Royal Bank at 30th November, 1866		1015 14 3
19. MEDALS on Hand at do.		23 15 0
20. ARREARS OF SUBSCRIPTIONS—		
1. Recoverable Arrears	£249 15 6	
2. Irrecoverable Arrears and written off	97 4 6	
		347 0 0
		£9376 14 2

ANTHONY MURRAY, *Chairman of Finance Committee.*
W. S. WALKER, *Member of Finance Committee.*
KENNETH MACKENZIE, C.A., *Auditor.*

Abstract of the Accounts of the ARGYLL NAVAL FUND for 1866.

CHARGE

		£	s.	d.
1	Balance in Royal Bank of Scotland at 30th November, 1865	£140	3	7
2	Interest on £3000 Heritable Security	125	7	6
3	Interest on £2200 Debenture Bonds	88	19	10
4	Progressive Interest on Bank Account .	1	15	3
		£365	6	2

DISCHARGE

		£	s.	d.
1	Allowance to Four Recipients	£160	0	0
2	Balance in Royal Bank at 30th November, 1866	205	6	2
		£365	6	2

ANTHONY MURRAY, *Chairman of Finance Committee*
W S WALKER, *Member of Finance Committee*
KENNETH MACKENZIE, C A , *Auditor*

Edinburgh, *7th January*, 1867

TRANSACTIONS

OF

THE HIGHLAND AND AGRICULTURAL SOCIETY OF SCOTLAND.

REPORT ON THE APPLICATION OF SEWAGE

By James Archibald Campbell of Inverawe, Newlands Farm, Rugby

[*Premium—Thirty Sovereigns.*]

A report on the results of the application of Town Sewage to the Farm, in order to be generally useful, should give some idea of the conditions under which such application was made. Some preliminary observations are therefore necessary.

Personal observation of the fertilising effects of Town Sewage near Edinburgh, and certain minutes of the General Board of Health, presented to Parliament, by command of Her Majesty, in the year 1851, were the means of inducing me, about eleven years ago, to lease a portion of the Sewage of the Town of Rugby, in Warwickshire, in order to apply it to some land partly my own, and partly rented, which I there occupy.

The town of Rugby, with its suburbs, had, by the last census, a population of 8400 souls, about 6700 connected with the Sewage works, and it had then been recently placed under the provisions of the Public Health Act of 1848. My farm consists of about 250 acres, under 190 acres of which are laid iron pipes of 3 inches diameter, and through them the Town Sewage is pumped every working day, by means of a 12 horse power steam engine, from a tank which receives all the sewage of the town daily through an 18 inch earthenware culvert. In the situation of this receiving tank, a great mistake occurred. It ought to have been built at a much higher level, and then the great expense of the steam engine and pumping apparatus would have been saved, for the Sewage might have flowed by gravitation through an iron conduit to the land where it was to be distributed. The Sewage which is not applied to my farm, is carried by means of similar iron pipes over about 250 acres, belonging to a neighbouring proprietor, who is in fact the lessee of the whole Sewage of the town, and supplies me under agreement. It is not unimportant to notice that the control of the works is thus out of my power, and also that my neighbour's land is situated at a lower level than mine.

There are some half dozen points to which the attention of any agriculturist proposing to utilise Town Sewage, should be directed. These I will notice generally in the first place, and then particularly as they have affected the application of the Sewage on my own farm,—

1st. The Situation of the Farm.
2nd. The Climate.
3rd. The Nature of the Soil.
4th. The Quality of the Sewage.
5th. The Quantity to be Obtained.
6th. The Cost to the Farmer.

First, we have the Situation or locality of the Farm. Putting aside for the present all question of engineering details, let us suppose the Sewage to have arrived at a level sufficiently elevated to permit the liquid to flow freely over the land where it is to be used. The question at once arises, to what description of crop can it be applied with the greatest benefit? And here situation becomes of great importance. If the farm be in close proximity to a large town where there is a ready market for dairy produce, there can be no doubt that the Sewage should be applied to the fertilising of the grass land, so that the largest possible quantities or crop of herbage may be produced, whether the grass be cut green and carried to the cows, or they be allowed to pick up their own food by the ordinary process of grazing. If the farm be situated near such a town as Edinburgh, where there is always a ready sale for forage cut green, the farmer will of course prefer to make his profit in that way, as being attended with small expense, and little or no risk. But in fact, there are few towns, if any, like Edinburgh, in this respect, and such sale cannot be safely calculated on. The next best plan is for the Sewage Farmer to keep cows himself, and in this case, situation is of much consequence. If the farm buildings are within half a mile of a large town, the sale of new milk will produce the largest amount of profit with the great advantage of being pretty much a ready-money business.

The second point to consider is the Climate or Atmospheric conditions under which the Sewage is to be applied. Now, it is obvious that the effects of the application of liquid manure must be different in a very moist climate, such as that which prevails in the west of Scotland, from what would be the case in a comparatively dry climate, such as that of the midland counties of England, or the east coast of Scotland. The experience, therefore, of its effects in the one locality cannot with safety be taken as a guide for its application in the other, unless, indeed, careful consideration be given, and due allowance made. Nor will it be sufficient to consider alone the number of inches of rainfall, the general state of humidity or dryness of the atmosphere is of yet greater importance—the Hygrometer must be consulted as well as the rain-guage.

The third point is the Nature of the Soil. As a general rule, it may be safely affirmed that land of the best quality, the highest class land, in fact, in point of fertility, is the least adapted for Sewage irrigation. Strong clay land, for example, although it has undoubtedly the inherent power of abstracting the most valuable manureal constituents of the Sewage, is by no means well adapted for sewage irrigation, from its physical texture. Instead of percolating through such land, the liquid would largely run off it, carrying away the fertilising matter either on the surface, or by means of the under-ground drains. Or if the land be flat, the liquid may stagnate on the surface, and the crop receive injury from the necessarily slow drainage.

The fourth point is the Quality of the Sewage. This must have some influence upon the produce of the soil, and we know well that there is considerable variation, not alone in different localities where it is more or less affected by the water supply of the town, but the quality varies at different hours of the day, and at different seasons of the year, according to the amount of rainfall.

The fifth point is the Quantity to be Obtained. This is of very great consequence to the Sewage farmer. No one need expect success in the application of Sewage, who can not obtain it either in large or small quantities as he requires it. Command over quantity at all times is absolutely necessary, if Sewage is to be applied profitably to the crops of the farm.

The sixth point is the Cost to the Farmer—and it is the most important of all. If the farmer is obliged to take the Sewage all the year round, and every day of the year, as is so generally the case under agreement with Boards of Health, and other local authorities, it is quite evident that a very small price indeed can be put upon it. Under such circumstances, from one farthing to one halfpenny per ton, is quite sufficient, if indeed the latter be not too much, but if he can obtain it when he pleases, where he pleases, and in any quantity, from two to three pence per ton may be given, and sometimes more.

I will now proceed to explain how far, in accordance with the views I have expressed on these several points, my farm is suitable to the application of Town Sewage.

First, the Situation,—

In this respect, there is little to complain of. The farm buildings were erected by myself, within half a mile of the town which supplies the Sewage, and were so arranged that milk cows might be kept under shelter all the year round, and the green forage carried to them in the season.

Second, the Climate,—

Situated as Rugby is, in the very centre of England, although at an elevation of something under 400 feet above the sea level, there is rather a deficiency of moisture in the atmosphere. The average rainfall for the last ten years is, 21·551 inches. Number of days on which any appreciable quantity of rain, snow, or hail fell averaged in the above period 158 in the year. The largest amount was in 1860, when 27·537 inches fell in 194 days, and the smallest amount was last year 1864, when 16·386 inches fell in 135 days.

Third, the Nature of the Soil,—

In this respect, my farm is not ill adapted for Sewage irrigation, holding a medium position between very strong and very light land. It is, generally speaking, a gravelly or sandy loam, with a subsoil of blue clay at a greater or less depth on the blue Lias formation, and the whole of it, or nearly so, has been drained to a depth of 4 feet, with tile pipes. The arable land is all ploughed with a pair of horses.

Fourth, the Quality of the Sewage.—

From the testimony of Professor Way, who has made very numerous analyses of the Rugby Sewage, no fewer than 93, in fact, it appears the manurial value is high, as compared with that of London. It contains about 7½ grains of Ammonia to the gallon, on the average, but of course it varies at different times of the day, and according to the season. I find in the last Report of the Royal Sewage Commission, that it is estimated that there are at Rugby, including rainfall, &c., on the average from 55 to 60 tons of Sewage per head of the population per annum, and that it is estimated that the London Sewage amounts, on the average, to about 60 tons, without, and to about 100 tons, with rainfall and subsoil water per head of the population per annum. Of course, therefore, if the proportion of water be as 60 to 100, the Rugby Sewage must be the richer in fertilising matter.

Fifth, the Quantity to be Obtained,—

Here I was placed at great disadvantage. My original agreement for Sewage, purchased from a third party, was to allow five dressings on every acre in the course of the year, or rather from March to October, for 20s the acre—including the expense of application. The amount of a dressing was fixed by the arbitration of Mr. Alderman Mechi, at 9,000 gallons, or, in all, 45,000 gallons per acre, or about 200 tons. This quantity, as I then stated, has proved to be utterly insufficient, and another agreement was made, under which I obtain a larger amount, but still not enough for profitable farming.

Sixth, the Cost to the Farmer,—

In this respect, I do not think I should have much reason to complain of the £150 of rent I pay for the Sewage, besides the expense of application, say £180 per annum, provided I received it when I required it, and in sufficient quantity, but, in fact, I have been a loser by my bargain every year from deficiency in these essential conditions.

With this preface, I will proceed at once to give the results of my experience in the utilisation of Town Sewage.

On first commencing in 1854, the Sewage was applied to the land by means of flexible gutta percha hose of two inches in diameter; this hose was fixed to a stand pipe, or hydrant, connected with the iron pipes under ground, and there was at least one such hydrant in every field, from which the Sewage flowed, so long as the steam engine and pump were working. Here let me state that the following results of my practical experience are taken from my farm books, and must be read as the jottings-down of an ordinary agriculturist, rather than the accurate observations of a man of science, to which indeed they have no pretension. The measurement of the Sewage was made by calculating from the time taken to fill a vessel of known dimensions several times during the day, a rough method perhaps, but sufficient for our purpose—viz., to regulate the price, which was estimated by quantity. The rate of delivery varied very much at times, of course, according to the level of the field, the length of the hose, the working of the steam engine, and the number of hydrants open, either on my own farm, or my neighbours, and especially in the case of the latter, as his land is mostly at a lower level than mine. These facts are worthy of note, because although they do not interfere with the quantity which was ultimately shed upon a field, yet they have an important bearing upon the right agricultural application of a sufficient quantity at the proper time.

I now give in a tabular form the application of Sewage to a dozen fields of my farm for the three years, 1854, 1855, 1856, when the hose and jet system was used exclusively under my first agreement. To the man of science, those tables will not be satisfactory from the want of minute accuracy in the weights and measurements of the Sewage and the produce, but I apprehend that the practical agriculturist will be able to derive from them lessons which may be of advantage to him, if his land is so situated as to render the use of Town Sewage advisable.

TOWN SEWAGE APPLIED—1854.

NEWLANDS FARM, RUGBY.

No.	Acres	Gallons per Acre.	Tons per Acre	When applied	Observations.
1	17	17,619	78½	March Sept. Oct. Nov.	Cut for hay, July 26, carried August 5th, about 1½ tons per acre. Most of the sewage put on after hay was carried, then pastured. Not very good.
2	6½	8,246	40	May	Spring Wheat sown March 1st, carried Sept. 8th, crop below average. Slightly mildewed, looked better after watering in May.
	3½	26,836	120	May and June	Potatoes—light crop, small tubers. Seed 11 bags, crop 100 bags.
3	2	26,000	116	May June and Sept.	Mangold, 2 acres—no other manure, grew well, but small, about 9 tons to acre; in same field 3 acres gave 15 tons to acre from Farm-yard dung.
	4	26,000	116		Turnips, 4 acres—very poor crop indeed; 12 drills in same field, from Farm-yard dung, gave a very fair crop.
4	5	25,072	112	April June Nov. Dec.	Old Pasture—no apparent results.
5	2¼	62,576	280	March 31 to Nov. 3	Italian Rye-grass, sown June 16th, began to cut Aug. 14th—first crop 10 tons to acre; kept 12 sheep 38 days, second crop.
6	2	23,100	103	April June	Tares, sown with manure in previous autumn—not good crop.
7	6½	6,646	29¾	March 25 to 29	Beans—good crop, 52 bushels per acre, no manure, good loamy soil, newly drained.
8	5	7,776	34¾	March	Meadow Hay, carried July 20th—1½ tons to acre, newly drained.
		29,160	130	Sept. Oct.	Pasture after Hay—only middling.
9	2½	14,230	63½	March June Sept.	Old Grass, 1½ acres, cut July 8th—1 ton to acre. 1 acre Swedes, with 20 cwts. dung to acre—good crop.
10	10	11,076	49½	March May	Sown Grasses—poor crop, about 15 cwt. to acre.
		17,724	79⅛	July Dec.	Pasture—only middling.
11	10	12,800	57½	March May July	Hay from old Grass, carried Aug. 8th—1½ tons to Acre.
		42,400	189¼	Aug to Dec. 15	Pasture after Hay—fair aftermath
12	14	7.836	35	March April June	Hay, 14 acres, carried Aug. 11—1 ton to acre; drained previous year.
	28	9,720	43½	Aug. Sept.	Pasture, 14 acres and 14 aftermath—only middling keep.

1855.

No.	Acres	Gallons per Acre.	Tons per Acre.	When Applied.	OBSERVATIONS.
1	17	48,021	214	April 11 to Aug. 11	This field was pastured. No visible change in quality or quantity of grass.
2	3	25,200	112½	April 23	Sewage applied on 3 acres of Tares, sown with manure Oct. 14th previous year, after potatoes—an inferior crop,
3	9	0	0	—	Barley, sown in April, with 12 carts dung per acre, to the 6 acres which had only sewage the previous year—average crop.
4	5	51,408	229½	April 23 to June 8	Old Pasture—no visible change—keep no better.
5	8	247,402	1104½	March to Oct. 6.	Italian Rye-grass, 3 acres 2nd year, 5 acres sown April, various manures applied in addition to sewage—crop about 15 tons to acre. Sewage applied every month and almost every week.
6	2	96,030	428¾	March to October	Half Lucerne half Italian Rye-grass—very thin crop of both. Sown with 20 carts dung per acre, previous August, 1854.
7	6½	6,332	28	March 7 to 31	Wheat, drilled 12 inches wide, sown with 12 carts town manure per acre, Nov. 17, 1854, and 4 pecks seed per acre, kind Hay's prolific, good crop—42 bushels to the acre.
8	5	24,128 41,184	107½ 184	April 8 to 14 July 23 to Aug. 11	Meadow, cut for Hay, July—1¼ tons first cutting, cut again for hay, September—15 cwt. second cutting.
9	2½	24,128	107½	April 8 to 14	Wheat—1 acre after Swedes, dibbled—good crop, 54 bushels. Beans—1½ acres, after old Lea—crop 49 bushels on 1½ acres.
10	10	31,464	140½	March and April	3 acres Spring Wheat—very poor crop. 7 acres Oats—average crop.
11	10	31,464 21,204	140½ 94½	April August	Old Grass, cut for hay July—fine crop, weather wet, badly Aftermath pasture—no way remarkable.
12	28	25,683	114½	March and April	Cut for hay, 1¾ tons to acre—rather better than that part which was cut the previous year.

1856.

No.	Acres.	Gallons per Acre	Tons per Acre.	When applied.	Observations.
1	17	15,294	68¼		Pastured—ceased to apply sewage, not getting enough to produce any visible effect.
2	10	0	0	0	3 acres Potatoes, 12 carts dung, and 24 bushels seed per acre—good crop. 7 acres Wheat and Beans, no sewage, reducing the area, the small dressings, by means of hose, and yet seeming to be useless.
3	9	152,093	679	July 8 to Oct. 4.	Drained 4 feet deep in winter, and subsoil-ploughed, 13 carts of dung ploughed in, and sown May 18th. Italian Rye-grass, 11 cwts of guano and 19 cwt. salt put on field—1st cutting July 6th, last cutting November 24th, when a single acre gave 2¼ tons at 5th cutting, remainder of field 4 cuttings, total crop 12¾ tons per acre—by no means good crop.
4	5	0	0	0	Pasture—no sewage, reducing area of application.
5	8	136,990	611½	April to October.	5 acres Italian Rye-grass, 2nd year, 3 acres do., 3rd year—Ammoniacal liquor from gas works mixed with liquor from cow byres, applied by watering cart also. Crop, 25 tons to acre, began to cut May 10th.
6	2	0	0	—	1 acre Lucerne, watered with cart, gas water and cow urine, &c.—18¼ tons per acre, cut 4 times. 1 acre Italian Rye-grass, 2nd year, cut 5 times—about 25 tons to acre.
7	6½	0	0	—	Wheat—A portion manured with water cart, from byres and gas works—showed marked luxuriance all the season.
8	5	109,514	489	March and April	Meadow—about 1½ tons hay, aftermath pastured.
9	2½	0	0	—	Winter crop, Tares and Rye, cut June 17th, gave 33 carts dung to acre. Swedes—good crop.
10	3	18,240	81	June 14	3 acres Mangold, 35 carts dung to acre—good crop, 34 tons to acre.
	7				7 acres, no sewage, 30 carts dung. Swedes—good crop.
11	10	136,344	608½	March 8 to June 12	Old Grass, cut for hay—good crop; cost 5s. per acre to mow.
12	28	45,362	202½	March 8 to June 12	Hay, on 20 acres, 18 of which had been winter sewaged at an extra cost of £20—crop better than previous year, cost 5s. 3d. per acre to mow—not extraordinary.
	18	91,200	407	Nov. 7 to March, 1855.	On 8 acres Oats, 49 bushels to acre, winter sewaged—did not pay.

If there is one lesson more distinctly to be learned than another from the experience of these three years in the application of Town Sewage, it is the utter unprofitableness of shedding small quantities over a large area of land. Both the lessee of the Town Sewage and myself were quite at one upon the necessity of concentrating the Sewage upon a smaller area, and accordingly, in 1857, I took more land from him with a new agreement for ten years by which I had the power to apply the Sewage without that limitation as to quantity which had embarrassed me before. Under this new agreement, I ceased, as a general rule, to measure the quantity applied, and kept it going all the year round, and chiefly on grass land. I have, however, made use of it for green crops, such as mangold wurtzel and turnips in dry seasons with good effect, and the same may be said of cereal crops, occasionally in spring, but not in wet seasons.

In 1857, I withdrew the Sewage from all the 12 fields numbered in the foregoing tables, except numbers 2, 3, and 11—about 26 acres.

It is to be observed that these three fields were watered all the year round, portion after portion, as was most convenient, by the hose and jet. It is impossible to estimate the quantity put on the land, it must have been considerable, but the results were by no means satisfactory, probably from insufficient supply during the previous season.

No. 2 Field.

Italian Rye grass was sown on 3 acres, May 20th, the land having been manured with 50 carts of dung, and 5 cwt. of guano, and 10 cwt. of salt and ashes. Begun to cut the crop July 13th. 4 more acres were sown August 5th, after being manured with 81 carts of dung. I have no record of the quantity cut, but well recollect that it was but an ordinary crop.

No. 3 Field.

Nine acres Italian Grass, second year, begun to water with Sewage, March 13th. Begun to cut the grass, April 13th. *N.B.*—6½ cwt. of guano was also applied to this field.

	Tons per Acre.	
1st crop gave	10½	
2nd do. do.	9⅓	
3rd do. do.	3½	
4th do. do.	3¼	
5th do. do.	2	finished cutting Nov. 17th.
Average,	29 1 1·7	

No. 11 Field.

Old grass pastured till April 24th. Sewage applied from March 6th to June 8th. Hay cut July 14th, carried July 24th, about 2 tons per acre. Sewaged upon in August, and pastured.

No. 8 Field.

This field was sown with wheat in February, after Italian grass, and abundant Sewage. A complete failure. Had to be ploughed up.

In 1858, I began to apply the Sewage by means of small open grips or gutters to the Italian rye-grass, and found them answer better than the hose and jet. They were cheaply made on the plan of Mr. Brickford, of Exeter. I have a small one horse plough fitted with two coulters, and a sharp cutting square-ended nozzle or share, which takes out about 4 inches of the soil, as it moves along, neatly and regularly, levels having first been taken by means of a triangle of wood, about 4 feet high, having a plumb line depending from its apex. The first grip is drawn as nearly as possible along the highest level, and from this are cut perpendiculars down the slope of the field, and, if necessary, more horizontal lines across the slope. By these the grass is better watered than by the hose, a larger quantity put on in a shorter time, and with greater regularity. Still the quantity I received was deficient, not enough to produce paying results. I applied it this year to the same fields as the year previous, Nos, 2, 3, and 11. 26 acres.

No. 2 Field .

Italian grass, second year, about 16 tons to the acre, in three cuttings. Thin crop. Season dry. Evidently not enough Sewage.

No 3 Field

Italian grass, third year. This field had more Sewage than No. 2, but the crop was quite as small.

No. 11 Field

Old grass cut for hay; still not more than two tons to the acre. Hose and jet constantly going.

No 18 Field

This is a field which I took in 1856, at that time very poor pasture. Its history, as respects Sewage, may be useful. In 1857 it was drained to the depth of 4 feet, the soil is light, and in some places very wet, a kind of quicksand from 3 to 4 feet below the surface. Sewage was applied by means of hose and jet. It did much better as pasture, and this year (1858) I took hay from it, about 1¾ tons of hay to the acre. In 1859, the Sewage was applied to 4½ acres of it, by means of the open gutters, from this portion 2 tons of hay per acre was cut, and it yielded an abundant aftermath. In 1860, the same process of irrigation by open gutters was carried on, and the result was an early bite for sheep, fully two tons of hay per acre, and an increased aftermath. In 1861, under the same plan, a crop of two tons of hay per acre was carried June 19th, and from 3 acres of the same field, not watered with Sewage, only one ton of hay per acre was obtained, and that was not carried until the 9th of September. In addition to this, the Sewaged portion was cut a second time, yielding 4 tons per acre of green forage for cows, between August 28th and October 18th, and besides that, about 1¼ acres were cut a third time during the same period, there was also a fair aftermath. In 1862, a very large supply of Sewage was given to this field, both winter and summer; probably above 8000 tuns to the acre. The whole field was cut green for the cows, when the 4½ acres which received the Sewage yielded—

	Tons.	Cwt.	Qrs.
1st cutting	50	10	2
2nd do.	31	0	3
3rd do.	22	14	2
	104	5	3

The 3 acres without Sewage, but top dressed with street soil, give only 8 tons 16 cwt. of grass cut green from the whole 3 acres.

No. 18 Field.

In 1863, with about the same amount of Sewage applied winter and summer, the 4½ acres gave—

	Tons.	Cwt.	Qrs.
1st cutting	47	1	2
2nd do.	33	3	2
3rd do.	19	11	2
	99	16	2

The small falling off in quantity this season I attribute to the character of the season, in point of temperature, which affects the period of cutting, nor is the supply of Sewage so abundant in a dry hot summer. In 1864, the supply of Sewage was greatly diminished. It was not applied in the winter months, nor from May 3rd to June 17th, most important weeks—the steam engine being out of order. And again the extraordinary drought of the season materially affected both supply of Sewage and growth of grass. The crop was, therefore, a comparatively poor one, the first cutting did not take place until the end of June.

	Tons.	Cwt.	Qrs.
1st cutting	24	2	2
2nd do.	16	2	0
3rd do.	10	1	1
	51	1	3

The 3 acres not Sewaged, but top-dressed with the liquid manure from the farm-yard tanks and gas works, by means of the water cart, gave fifteen cwt. of hay per acre—by no means a bad crop for the season.

This field, No. 18, gave a very large aftermath, and has been closely grazed up to April 18th of the current year. It has kept a score of large Leicester teggs all the winter, and done them well with the assistance of a small allowance of oats daily. It had no Sewage all winter, and not much since, as the steam engine is again out of order.

EXPERIMENT ON NATURAL GRASS.

1861.

In 1861, four plots of about one acre each were marked out in a field of old grass pasture on my farm. The Sewage applied was accurately guaged, and the produce carefully weighed. One plot was to have no Sewage, and the remaining three to have it in different quantities. The Sewage was put on by means of open gutters every month, in the first year, from March to November, and the grass was cut and carried to my milk cows from May to November.

No. of Plot.	Average.	Quantity of Sewage per Acre.	Quantity of Grass per Acre.			
	Tons.	Tons.	T.	C.	Q.	L.
1	One	None	9	5	3	5
2	·99375	2073 68	14	16	3	8
3	·93081	4423·23	27	4	0	10
4	1·00512	6152·74	32	15	3	0

GRASS CUT PER MONTH.

	PLOT I.				PLOT II.				PLOT III.				PLOT IV.			
	T.	C.	Q.	L.	T.	C.	Q.	L.	T.	C.	Q.	L.	T.	C.	Q.	L.
May	—	—	—	—	—	—	—	—	—	—	—	—	1	9	3	14
June . . .	—	—	—	—	4	17	0	14	7	19	1	23	8	14	3	8
July. . . .	6	4	0	7	2	8	0	15	4	6	0	26	6	14	0	13
August . . .	—	—	—	—	3	16	2	23	4	12	2	8	5	18	2	16
September . .	2	2	2	8	1	3	0	12	6	5	1	7	5	0	0	5
October. . .	0	19	0	18	2	11	3	0	0	8	0	24	0	16	8	23
November . .	—	—	—	—	—	—	—	—	3	9	1	6	4	2	0	5
Total . .	9	5	3	5	14	16	3	8	27	0	3	15	32	15	3	0

1862.

This year the same field was again irrigated with Sewage, as in the year previous. The same division into plots being continued. It is well worth while to take notice that plot 4, which received the largest amount of Sewage, did not yield so large a return as plot 3, which had 3000 tuns less. This is probably owing to the wet season. The rainfall for 1862 was 25·185 inches; for the previous year, 1861, it was 20·819, and the year following, 1863, it was 18·514 inches.

No. of Plot.	Average.	Quantity of Sewage per Acre.	Quantity of Grass per Acre.			
	Tons.	Tons.	T.	C.	Q.	L.
1	One	None	8	3	1	10
2	·99375	2901·8	27	18	0	18
3	·93081	5994·5	34	10	0	19
4	1·00512	8986·7	32	9	2	22

GRASS CUT EACH MONTH.

MONTH.	PLOT I.				PLOT II.				PLOT III.				PLOT IV.			
	T.	C.	Q.	L.	T.	C.	Q.	L.	T.	C.	Q.	L.	T.	C.	Q.	L.
May	—	—	—	—	0	19	1	19	9	15	3	9	8	7	3	6
June . . .	0	8	1	26	5	10	0	10	5	16	0	26	5	15	1	15
July	3	16	0	23	8	2	3	2	—	—	—	—	4	19	1	19
August . . .	2	8	2	10	4	16	2	16	9	12	0	25	2	0	2	24
September . .	—	—	—	—	4	0	1	10	6	12	2	10	9	15	0	0
October . .	1	10	0	7	4	8	3	16	2	13	1	5	1	11	1	14
Total . .	8	3	1	10	27	18	0	18	34	10	0	19	32	9	2	22

1863.

The same field was the subject of exact experiment. This year, the Sewage being applied in similar proportions, but the atmospheric character of the season was very different, the rainfall below the average. So we find plot 4 again giving the largest produce, not however sufficient in excess over plot 3, to warrant the application of 3000 tons additional.

No. of Plot.	Average.	Quantity of Sewage per Acre.	Quantity of Grass per Acre.			
	Tons.	Tons.	T.	C.	Q.	L.
1	One	None	4	18	3	13
2	·99375	2998·9	22	5	0	11
3	·93081	5999·6	34	18	1	27
4	1·00512	9000·7	37	0	2	5

GRASS CUT EACH MONTH.

MONTH.	PLOT I.				PLOT II.				PLOT III.				PLOT IV.			
	T.	C.	Q.	L.	T.	C.	Q.	L.	T.	C.	Q.	L.	T.	C.	Q.	L.
April . . .	0	0	0	0	0	0	0	0	0	0	0	0	3	16	3	12
May	0	0	0	0	4	9	1	25	12	4	3	18	6	0	0	15
June . . .	0	0	0	0	6	4	3	3	3	9	2	20	10	13	2	0
July	3	18	3	14	6	7	3	9	5	17	2	2	0	0	0	0
August . . .	0	0	0	0	0	0	0	0	4	2	3	5	7	15	3	16
September . .	0	19	3	27	2	7	1	27	6	12	0	23	7	14	0	2
October. . .	0	0	0	0	2	12	1	15	2	5	3	5	0	14	1	20
November . .	0	0	0	0	0	3	0	16	0	5	2	10	0	5	2	24
Total . .	4	18	3	13	22	5	0	11	34	18	1	27	37	0	2	5

1864.

This year the grass was cut green, and carried to the cows, as in the three previous years, from the same field, but no Sewage was applied, as it was desirable to know what permanent effect, if any, was produced by Sewage. In consequence of the extraordinary drought of the season, the produce of all the plots was very inconsiderable. It is evident, however, that the Sewage still maintained an influence, and that in some proportion to the quantity applied. The soil is of a gravelly nature. The rainfall was only 16·386 for the year, the average being 21½ for 10 years past.

No of Plot.	Average.	Quantity of Sewage per Acre.	Quantity of Grass per Acre.			
	Tons.	Tons.	T.	C.	Q.	L.
1	One	None	1	8	1	0
2	·99375	None	2	17	1	7
3	·93081	None	5	4	1	20
4	1·00512	None	5	14	2	6

MONTH.	PLOT I.				PLOT II.				PLOT III.				PLOT IV.			
	T.	C.	Q.	L.	T.	C.	Q.	L.	T.	C.	Q.	L.	T.	C.	Q.	L.
May	0	0	0	0	0	0	0	0	5	4	1	20	5	9	3	0
June . . .	1	8	1	0	2	17	1	7	0	0	0	0	0	0	0	0
August . . .	0	0	0	0	0	0	0	0	0	0	0	0	0	4	3	6
Total . .	1	8	1	0	2	17	1	7	5	4	1	20	5	14	2	6

EXPERIMENT ON ITALIAN RYE-GRASS.

1863.

No. 3 Field.

This year I marked out four plots of ground in No. 3 Field of one acre each, the crop being Italian rye grass of the first year. One plot to have no dressing of manure, a second to be watered with Sewage, a third to have Sewage applied to double the amount of the second, and the fourth to be watered with liquid manure from the farm yard tank, mixed with ammoniacal liquor from the gas works. I must premise that the weather was very dry and warm during the greater part of the time. The first cuttings were particularly unsatisfactory from the long continued drought of the Spring.

		Inch.		Inch.		Inch.		Inch.
Rainfall,	Feb.,	·454;	March,	·314;	April,	1·411;	May,	·442.
Average,	„	1·49;	„	1·646;	„	1·538;	„	1·613.

No.	Manure	Crop of Grass				Number of Cuttings
		T	C	Q	L	
1	None	16	17	3	2	Five cuttings
2	780 tons Sewage	20	15	0	25	Six cuttings.
3	1523 tons Sewage	25	3	0	12	Six cuttings.
4	Liquid from farm-yard tank and gas works, distribution by water cart .	30	6	1	24	Five cuttings

EXPERIMENT ON BARLEY AFTER ITALIAN RYE-GRASS.

1864.

No 3 Field.

This year I sowed the four plots of one acre each in No. 3 field, which had been the subject of experiment with Italian rye-grass the previous year, with barley. The Sewage was applied in the same proportions to the same two plots as before from January 15th to April 2nd, when the field was sown. The season was unusually hot and dry, and the crops on the manured plots most luxuriant, but in consequence they were very much lodged before harvest, which told against the produce, especially in the case of the plot manured with the water cart. Plot 1, it will be remembered, had no manure for two years.

No of Plot	Kind of Manure	GRAIN.				Grain.	Chaff.	When sown.	When reaped	When Carried.	When Threshed.
		Best.	Weight per Bushel.	Light.	Total.						
	Sewage Tons.	bush.	lbs	st. lb	c q lb	t c q	c q lb				
1	0	38	57½	4 7	19 2 7	1 8 3	8 1 18	April 2nd	August 11th.	August 20th.	October 18th.
2	147	52½	56¼	8 5	27 1 5	2 1 2	4 2 2				
3	280	56½	56½	12 0	29 2 26	2 7 2	4 2 14				
4	Liquid from Farm and Gas Works, by Water-cart	57¾	56½	12 5	29 3 9	2 9 2	4 1 26				

EXPERIMENT ON OAT CROP.

1863.

This year I made an experiment on a field of 9 acres, sown with oats after wheat. I had four plots measured off, about one acre each, the first had no manure, the second and third had different quantities of Sewage, and the fourth had 1½ cwt. of Nitrate of Soda, the remainder of the field was also dressed with

Nitrate of Soda. It was a most favourable season for the Sewage, and the very reverse for the Nitrate, as the Spring was very dry and parching. The result proves the great utility of applying Sewage to Cereal crops in dry seasons. I can not but regret that it did not occur to me to try the effect of water alone on another plot.

No. of Plot	Acreage	Kind of Manure	GRAIN.				Straw.	Chaff	When Sown	When Reap'd.	When Carried.	When Thrashed
			Best	Weight per Bushel	Light.	Total.						
		Sewage Tons.	Bush	lbs.	st lb	c q lb	t c. q	c. q lb		Aug	Aug	
1	1·0063	None.	56	44	6 4	22 3 1	2 1 0	1 2 20	March 2nd.	4th	17th	October 2nd.
2	1·0102	188	70	43	15 4	28 2 0	2 11 2	1 3 23		8th	19th	
3	1·0121	530	68	42	22 0	28 1 0	2 19 3	2 1 19		14th	19th	
4	·9989	Nitrite of Soda Cwt. 1½	54	44¼	9 5	22 2 11	2 0 3	1 3 11		4th	17th	

EXPERIMENT ON WHEAT AFTER BEANS.

1864.

The soil of this field is of a rather strong character, such as is commonly called wheat and bean land, and I was desirous to try the effect of a small dressing of Sewage. For the sake of comparison, I tried one plot with Nitrate of Soda, and another with no manure. The extraordinary drought of the season was of course in favour of the Sewage, but it seems to have told against the whole crop, for it was certainly below the average. The plots on this occasion were half an acre each.

No of Plot	Acreage.	Kind of Manure	GRAIN.				Straw.	When Sown.	When Reaped	When Carried.	When Thrashed.
			Best.	Weight per Bushel	Light.	Total.					
		Nitrate. lbs	bush.	lbs.	st. lb.	c q. lb.	t. c q				
1	·49997	0	12½	64	4 4	7 2 26	0 10 0	October 18th, 1863.	August 18th, 1864.	August 19th, 1864.	October 2nd, 1864.
2	·49992	56	14½	64	4 2	8 2 19	0 11 1				
		Sewage. tons.									
3	·50013	55	13½	64	4 5	8 0 16	0 11 2				
4	·49990	109	16½	64	4 13	9 3 1	0 13 2				

A mistake occurred about the Chaff in this experiment, and it was not weighed.

EXPERIMENT ON BARLEY AFTER TURNIPS.

1864.

The field on which this experiment was made, had produced a fair crop of Swedes the year previous, which had been carted off to the cattle. Of course, as in the other experiment of this year, the excessive drought was in favour of the Sewage, and against the Nitrate of Soda. The plots were half an acre each.

Rainfall.

	June. Inch.	July. Inch.	August. Inch.
1864, ...	·870	·275	·725
Average of 10 years, 1864 included,	2 504	2·259	1·981

No. of Plot	Acreage	Kind of Manure.	GRAIN.				Straw.	Chaff.	When Sown	When Reaped.	When Carried	When Thrashed.
			Best.	Weight per Bushel	Light.	Total.						
		Nitrate lbs.	Bush	lbs.	st. lb	c. q. lb.	c. q. lb	c q lb				
1	·50010	0	23½	58	3 2	12 0 19	14 0 6	2 0 14	March 18th.	August 4th.	August 15th.	November 21st.
2	·49992	56	26	58	2 9	13 1 5	15 0 9	2 1 5				
		Sewage. tons.										
3	·50009	86	27½	57¾	4 9	14 1 9	15 2 3	2 1 17				
4	·50012	16	25½	58	2 1	12 2 8	14 3 5	2 0 12				

In 1864, I marked out four half-acre plots in a turnip field of nine acres, for two different quantities of Sewage, and two different manures, leaving a fifth half acre unmanured, for comparison. Unfortunately, the excessive drought or heat of the season, brought us a visitation of the *Grub* to such an extent, that after having arrived at a good size, the whole field was completely destroyed. In 1859, however, I tried the effect of Sewage on green crop, but not with measured quantity. The crop was Mangold Wurtzel, and had arrived at the size of an orange, when it began to give way, apparently from heat and drought. I turned a stream of Sewage down the drills, and allowed it to run freely for several days. The result was to invigorate the plant, and secure me a crop of 26½ tons to the acre.

As some guide to the value, positive and comparative, of Sewaged grass, I will now give a statement of the quantity of grass consumed in 24 weeks by 20 of my milk cows, ten of which were fed on natural meadow grass, which had been well watered with Town Sewage, five on the same description of grass, but without Sewage, and five more on Italian rye-grass also unsewaged. I also give the quantity of milk produced from each lot.

GRASS CONSUMED AND MILK YIELDED BY 20 COWS IN 24 WEEKS.

1863.

No. of Cows.	Kind of Food	Weight of Food eaten in twenty-four weeks.				Milk yielded in twenty-four weeks.	Grass consumed each cow per day.			Milk from each cow per day.	
		Tns.	Cwt.	Qrs.	Lbs.	Gallons.	Cwt.	Qrs.	Lbs.	Qts.	Pnts.
5.	Natural Grass without Sewage	37	17	2	9½	2424	0	3	17¼	11	1⅓
5.	Italian Rye Grass	50	17	0	21	2467½	1	0	23	11	1¼
10.	Natural Grass Sewaged.	119	3	1	10½	4524½	1	1	18¾	10	1½
	Total. . .	207	18	0	13		1	0	26	11	0¼
All the 20.	Cake for the last eleven weeks.	3	3	3	0	9416					

I might very largely extend such tabulated statistics of the consumption of Sewaged grass by my cows, and the quantity and quality of the milk yielded by them, but it would be perhaps travelling a little beyond the scope of this report, and indeed it is the less necessary for public information that the third Report of the Royal Sewage Commissioners just issued, contains a series of most elaborate and accurate tables on the subject, taken from my own farm. I would, in conclusion, draw attention to the great difference in the results of Sewage application which arises from atmospheric conditions. In such seasons as 1863 and 1864, when the rainfall was much below the average, the Sewage was deficient in quantity, but above the average quality, whereas in 1860 and 1862, the very reverse was the case. Now this has a most important bearing upon the question of the application of Sewage to the arable crops of the farm, so strongly advocated by such a high authority as Baron Liebeg. It so happens that the only accurate experiments made by me on such crops, the details of which I have already given, were made in unusually dry years, so that of course a higher value appears to be due to the Sewage from increased crops, than it would be justly entitled to on an average of years. Further experiments are very desirable in this direction, but enough has been done to prove that the application of small quantities in dry seasons may be very beneficial, indeed the small applications seem to have proved better than the larger ones. It should also be noted that with large application of Sewage, the grain decreases in weight per bushel, whereas the light or offal grain is largely increased, and also the quantity of straw. This coroborates the general opinion as to the effect of Sewage upon grain crops.

In the case of No. 3 Field, as will be seen from the annexed tabular statement, if the value of Sewage applied to Italian Rye-Grass the first year be estimated by the increase of the crop, it is only a halfpenny per ton for each of the two plots, the quantity of Sewage being large, but nearly double as much on one as on the other.

In the second year, however, with a much smaller quantity of Sewage it was 7¼d. and 5¼d. per ton, and the larger value for the smaller quantity. I am aware that my calculations of value may be open to objection on several grounds, but this will not detract from their utility as comparative statements. The quantities are correctly given, and any one can make his own calculations according to the prices in his own locality.

' STATEMENT OF INCREASE IN NO. 3 FIELD.

1863.

No of Plot.	Manure.	Crop.				Increase.				Value.		
		Tons	Cwt	Qrs	Lb	Ton.	Cwt.	Qr.	Lb.	£	s.	d.
1.	None Extra	16	17	3	2	—	—	—	—	—	—	—
2.	Sewage 780 tons	20	15	0	25	3	17	1	23	1	18	6
3.	Sewage 1523 tons	25	3	0	12	8	5	1	10	4	2	

Representing about one halfpenny per ton of Sewage for each plot Italian Grass at 10s. per ton.

1864.

Plot	Manure.	CORN.			Straw.		INCREASE—CORN.				Value.		
		Dressed.		Light.			Dressed		Light	Strw			
		Bush.	Pk	Lbs.	Cwt	Lb.	Bush.	Pk	Lbs.	Cwt	£	s.	d
1.	None.	38	0	63	32	13	—		—	—		—	
2.	Sewage 147 tons.	52	2	117	46	0	14	2	54	13¾	4	10	0
3.	Sewage 280 tons.	56	2	168	52	14	18	2	105	20	6	2	9

Representing per ton of Sewage—Plot 2, a little above 7¼d; Plot 3, a little above 5¼d.

Barley dressed 4s. per bushel, with light 1d. per lb.; straw, 40s. per ton.

STATEMENT OF INCREASE ON HALF AN ACRE OF BARLEY.

1864.

Plot	Manure.	CORN.			Straw.			INCREASE—CORN.					Value.		
		Dressed.		Light.				Dressed.		Light	Straw.				
		Bush	Pk	Lbs.	Cwt	Qr	Lb	Bush.	Pk	Lbs.	cwt	lb	£	s	D
1.	None Extra.	23	2	44	16	0	20	—		—	—		—		
2.	Sewage 86 tons	27	2	65	17	3	20	4	0	19	1	84	1	1	1
3.	Sewage 16 tons.	25	2	29	16	3	17	1	3	Decrease 15	0	87	0	13	0

Value of Sewage—No. 2 Plot, 3d. per ton.
No. 3 Plot, 9 d. per ton.

INCREASE ON HALF AN ACRE OF WHEAT.

1864.

Plot.	Manure.	CORN.			Straw.		INCREASE—CORN.					Value.		
		Dressed		Light			Dressed		Light	Straw				
		Bush.	Pk	Lb.	Cwt.	Lb	Bush	Pk	Lb.	cwt	lb	£	s.	D
1.	None Extra.	12	2	60	10	0	—		—	—		—		
2.	Sewage 55 tons.	13	2	61	11	56	1	0	1	1	56	0	8	1
3.	Sewage 100 tons.	16	1	69	13	56	3	3	9	3	50	1	6	6

Value of Sewage—No. 2 Plot, 1d. per ton.
No. 3 Plot, 3d. per ton, or nearly so.

I have now given such of the results of my experience in the application of Town Sewage to the farm as I think likely to be of use. That experience has extended over eleven years, and although I fully appreciate the value of Sewage for certain descriptions of crop, and under certain conditions, I do not think I should be justified in recommending it for general adaptation to the usual routine of the farm. It seems pretty evident to me that the expense and trouble of applying it by means of pipes to arable ground, would not be compensated by the increase of the crop. Nor could it be applied with regularity on account of the variable nature of our climate. To the dairy farmer for the purpose of obtaining heavy crops of green forage, it will be always useful, and by its application to grass lands, it may be made of essential benefit to the community. There is no reason why the Sewage of all our towns should not be utilised in this way, producing a larger supply of nutritious milk. and protecting the water of our rivers and streams from pollution.

REPORT OF THE AGRICULTURE OF AYRSHIRE.

BY ARCHIBALD STURROCK, STRUTHERS COTTAGE, KILMARNOCK.

Premium: Thirty Sovereigns.

THE most southerly of the western shires, Ayrshire, conjoined with Renfrewshire, is generally spoken of as being *par eminence* "the west-country:" East-Lothian and Berwickshire in common parlance being similarly distinguished as "the east-country." Ayrshire is outlined somewhat like a half-moon, with the concavity embracing the sea. From the northernmost point on Kellyburn in Largs parish, to the Galloway marchburn on the north shore of Lochryan, the length on a bee-line is fully 60 miles; keeping by the contour of sea-coast, it extends to 70 miles; and going from horn to horn through the heart of the county as the crow flies, the real length will be about 80 miles. The breadth varies from 3 to 4 miles at the extreme points to about 28 in the middle,—the widest part being across Kyle, from Troon harbour to the source of the Ayr water at Glenbuck, and the average breadth may be set down as about 15 miles.

Historically and popularly, the county is composed of three large districts or divisions,—Carrick, Kyle, and Cunningham,—and which partitioning is still recognised and of good service for several local purposes, though long since obsolete politically. Carrick includes that portion lying south of the River Doon; and is bounded on the east by Kirkcudbrightshire, and southwards by Wigtonshire and Lochryan. This division contains an area of about 280,000 statute acres, of which about 34 per cent. it is estimated—viz., 95,000, are under cultivation. Kyle occupies the centre of the county, lying between the Doon and the Irvine waters, and is bounded on its eastern side by the shires of Kirkcudbright, Dumfries, and Lanark. The total land-surface of Kyle is about 270,000 statute acres, of which fully 40 per cent. it is estimated—say 115,000 acres, are under cultivation. The northern division of Cunningham, though the least in extent, is by much the most populous, and a much greater proportion of its surface is culturable, than in either of the other two. Cunningham comprehends all north of the River Irvine, and marches along the whole of its north and north-eastern border with Renfrewshire, excepting a few miles due east at Drumclog Moor, where the parish of Avondale in Lanarkshire comes in. It has a total area of about 185,000 statute acres, of which about 57 per cent. it is estimated—viz., 105,000 acres, are under cultivation.

The total area of the county is 1149 square miles, or 735,262 statute acres. Less than one-half, or 315,000 acres, may be put as cultivated land; the remainder being hills, moors, mosses, lochs, roads, &c. We may reckon about one-third of the pastoral hills and moors, as good dry grazing-grounds; the other two-thirds being spongy moor, heather, or moss-hags, with occasional dry grassy-patches intervening. Plantations of all ages and kinds are included as cultivated lands, and there are large extents of thriving wood throughout the shire, especially in Kyle and Cunningham. The total acreage under wood is estimated at 40,000 acres.

During the sixty years elapsed of this 19th century, the population of Ayrshire has considerably more than doubled. In 1801 the population was 84,207; and by the last census of 1861, it was 198,971. The present parliamentary constituency of the county is 4691, being the largest (we suppose) in Scotland. The valued rental of the county for year 1864-65, was £762,661, apportioned amongst the three divisions as follows,—Cunningham £330,887, Kyle £291,545, Carrick £140,229; and being exclusive of about £120,000 for railways, and £105,000 for the three parliamentary burghs.

SECTION I.

General Aspect—Woodland—Soil—Climate, &c

The surface of Ayrshire is very diversified, and yet upon the whole somewhat tame; boasting of nothing sublime in scenery, but still a large choice of pleasing landscape. No part of it can be strictly termed level, as almost every field undulates more or less. From the surface abounding in swelling knolls and low rounded hills, dotted and streaked with thriving plantations and hedge-row timber, from much old woodland on the "banks and braes" of the many rivers, burns, and glens, and from the very numerous county seats of the landed proprietary, all embosomed in large extents of wood, as well as most of the farm-steads being more or less surrounded by belts of planting, the face of the county generally has a highly ornamental appearance. For fine river scenery and woodland, there are few counties, if any, in Scotland, that could match the following walk—namely, starting above Sorn Castle on the water of Ayr, and thence down the river *via* Ballochmyle, Barskimming, Failford, Coilsfield, Enterkine, and Auchincruive. The two divisions of Cunningham and Kyle, mostly rise from their sea-borders in easy acclivities and wavy-champaign country, till terminating in an expanse of pastoral moorland and hill towards their north and eastern verges. The only part of their coasts where bold and rocky, being for a short distance at Portincross, in West Kilbride parish. But within the past 25 years, coal-mining and iron-smelting have vastly outgrown their former proportions throughout Kyle and Cunningham, particularly in the latter, and many parts of these, consequently, now possess little of rural quietness.

. The general aspect of Carrick is of a rugged character, hence, probably, the name. The Carrick coast, from a little past Girvan, all on to Loch-ryan, as well as at Culzean Castle, and several other parts, is bold and rocky; although there are some fine stretches of warm low-lying shore-land between Doonfoot and Girvan. This division is generally hilly, with a few lovely and very fertile valleys interspersed. The south-eastern half, or more, particularly, is very wild. The altitude of the hills to the east of Carrick and Kyle, and north-west of Cunningham, will run between 800 and 1000 feet—the summit-heights attaining 1,500 or 1,600 feet being few; but the moors, generally, will not be more than from 600 to 800 feet, whilst the *average* altitude of the cultivated lands may be put at about 150 feet—all above sea level. Carrick, unlike the other divisions, is yet almost exclusively an agricultural and pastoral district.

The pastoral and tillage lands of Ayrshire, with but small exception, are quite distinctly separated one from the other. The former lying semicircularly around the rim, and enclosing the cultivated lands on the lower slopes and bottom of the half basin. Owing to the basin-like make of surface, no other county of Scotland can shew so great a stretch of cultivated land at one view; and few counties in Britain present such rich and varied prospects, as are to be seen from almost any of the interior heights. No other part of Scotland either, bears such a close resemblance to some of the English counties; mainly from the prevalence of hawthorn hedges interspersed with trees, surrounding the comparatively small fields. It would be a pity, certainly, to see the hedge-row timber entirely disappear, on account of its ornamental show, but many of the trees might be rooted out to the advantage of both landlord and tenant. And although the hedge-rows are as plentiful as in most English counties, yet they are not such wide straggling affairs. The fence in all cases consists only of a single line of thorns, which being occasionally cut over when the fields are lifted to prevent thinning at the roots, and in very many cases yearly dressed up the sides, the ground can thus be got ploughed till within a foot or so of the hedge bottom. Beech plants are always intermixed with the thorn quicks for fences towards the moor-edges; and dry stone dykes may occasionally be seen here and there on upland farms, but these are not at all common, except on sheep runs. For several years past more attention has been paid to the regular and proper scutching of the hedges. The writer would wish to note just two instances of first-class fences—viz., those (thorn) on the farm of Whinpark, near Kilmarnock, tenanted by Mr. James Brown, and two of beech, some 3 miles in length, due north from Sorn Castle gates on the Galston road. These, each of their kind, could not be matched in the kingdom; although there are many other cases about equally as good in the county.

Most of the present woodland of Ayrshire was planted towards the end of last century and beginning of this, consisting chiefly of Larch and Scots Fir, but having generally hardwood trees intermixed—Beech, Ash, and Elm, predominating. In many parts of Kyle and Cunningham, are miles of road closely set on each side with large umbrageous beeches, forming most delightful over-arching avenues. Oaks do not seem to have been much thought of by Ayrshire planters in days of yore, although there are now some very fine plantations of *young* oak —from 30 to 50 years—throughout the county, and specially on the Cessnock and other estates of the Portland family. The present inheritors now and for years back are reaping the beneficial effects of this wise foresight on the part of their ancestors, in annual sales of valuable timber, and thus making room for further planting. Great part of the old Larch has been cut down years ago for railway sleepers, but the ground was almost always replanted. There are thousands of acres yet in Ayrshire, chiefly in the upland and moorland districts, where shelter for the sheep, and cattle, and crops, is in many places much needed, on which a better paying crop than wood could not be put. Acres that the writer has seen being cut down for some time back, yielded sums corresponding to an annual rental of from £4 to £5; and the same land, if let for ordinary purposes, would not have brought as many shillings in some cases, and not more than from 15s to 20s per acre in even the best. A large demand exists for colliery prop-wood, and even the thinnings are thus valuable. Most of the wood is planted in judiciously placed clumps and belts as shelter on the more exposed grounds; and for useful works of this kind executed, say between 1830 and 1850, the names of the late Earl of Eglinton, the late Duke of Portland, the late Mrs Sommervell of Sorn Castle, and the late Mr. Nicol Brown, and present Mr. Thomas Brown of Lanfine, are specially deserving of notice. During the last 10 or 12 years, the proprietors generally have been planting to a greater degree than for many years previous, and by much the most extensive operation in that line at present, is on the Dumfries Estate, in the Cumnocks, belonging to the youthful and accomplished Marquis of Bute. Some 500 acres have been planted of late on the Dumfries estate, and there are still from 800 to 900 acres of land laid off to fill up. Few larch are now planted in comparison with Scots Fir and Spruce, and about ten of these to one of hardwood, will be about the proportions put in. Ayrshire, in whole, is probably the most densely wooded county in Scotland; and this fact, along with the general insufficiency of drainage, accounts somewhat for the great and constant moistness of climate.

More than one-half of all the arable lands consists of clays and heavy loams. Situated on the coal formation from near Girvan up to Beith, outbursts and dykes of trap-rock, and limestone abound, and the strength of the soil varies much. On many farms, consequently, some of the fields or parts of them may be of comparatively friable soil, whilst the others are of the usual deep clay; mostly with clayish sub-soil, and in the basins or lower-lying tracts of land, from two to ten fathoms of boulder-drift-clay ere the first bed of new red sandstone is reached. Within the last twenty-five years, however, and in some cases for a much longer period, much of the clay land, through drainage and other meliorating influences, has been changed into a darker coloured, and more workable, but still very strong loam. Nowhere is such change more observable than in the valley of the Irvine; in which, if we trace out a walk from Kilmarnock, south-west by Forty-acres Toll to Dundonald, thence north-west to Irvine, thence round by Auchenharvie to near Stewarton, and back *via* Rowallan to Kilmarnock, we will enclose some forty square miles of the truest, and best cropping and grass land in the county. The clays on the higher ridges are thinner and nearer the till, of a brownish red colour generally, and totally unworkable for green crops with Ayrshire climate. That kind of clay soil hardens into a brick-like substance during the occasional summer droughts. A stripe of land stretching along the shore in an almost unbroken line from Largs to past Girvan, and, excepting a few places of high rocky coast, having a breadth of from one to three miles, comprises the greater part of the light soils. Considerable extents of good holm-land—deep light loams mostly—are scattered throughout Kyle and Cunningham by the banks of the Ayr, Irvine, Garnock, and other waters; and more of such of even finer quality, alongside of the Girvan and Stinchar rivers, and in other minor vales of Carrick. Carrick division, although least in proportion of arable land, contains by much the largest extent of good turnip-soils; most of the seaward declivities of all the high grounds from Doonfoot to past Ballantrae being of a light friable nature, excellent for green cropping, and producing a strong sward of sweet grass. As for level "carse-clay land," there is not a bit of it in all Ayrshire.

The arable farms towards the moor-edges of Cunningham and Kyle, usually include a large portion of what can only be described as peatish clay soil, commonly termed *grey land*, and which, barring the lateness of situation, is not the worst kind of soil in the county. Throughout the glens of the hilly parishes, such as Muirkirk, New Cumnock, Barr, Colmonell, &c., the arable lands are far more light and friable than those lying in the centre of the basin. All the moundish hills, or hillikins rather lying within the basin, such as the Dalry Hills, the Galston Moor and Craigie Hill ranges, Dundonald Hill, the Craigs of Kyle, &c., are cultivated up to and over their very summits. The summit soils are generally of the prevailing clay of a more sterile sort, except where lying close on the whin or upheaved limestone. The hilly tract of land to the East of Largs and West Kilbride parishes, is mostly covered with good sound grass, growing upon peaty moorland with a clayish sub-soil—the predominating rocks being the old red sandstone and trap. The higher parts in the north and centre of Carrick also, are mostly under good old grass, admirably adapted for cross-bred and cheviot sheep. Some of the best land in Carrick lies on the lower slopes of these hillikins, such as up the water of Stinchar from Ballantrae by Colmonell, and in several other places.

Large areas of moss and moorland were brought under cultivation, both by proprietors and tenant-farmers, about the latter end of last and beginning of this century; but little progress in that line can be noted during the last twenty-five years, with some exceptions, as for instance, at Corwar. Most of the Eglinton portion of Shewalton Moss is now under thriving wood (spruce and Scots fir) of from ten to twenty-five year's growth, and some of it older; and very many patches of moss and swamp throughout, the shire, included within the bounds of farms long cultivated and from half-acres or so up to five and six acres, have mostly all been thoroughly reclaimed since tile-draining became general. On many of the moor-edge farms, chiefly in the parishes of Fenwick, Loudon, Sorn, Auchinleck, &c., small fields of reclaimed moor have been, and are being, added now and again to the ploughable lands. These improved blackish soils are famously adapted for growing sound potatoes, and a ready market and good prices exist for any quantity grown on them, as a change of seed to the clays and sands. The reclamation of sands along the coast, will be noticed farther on.

The locality where the improvements of Mr. Rigby Wason of Corwar have been effected, extends from the village of Barrhill to the water of Cree in the extreme south-east of Carrick. With the aid of his tenants, Mr. Wason has altogether reclaimed and improved, fully 3,500 acres of wild heathery moor and 200 acres of black deep moss—mostly all now excellent pasture—with no appearance of the heather returning. Corwar estate, when Mr. Wason bought it, was merely a wild moor with hardly a vestige of housing upon it; but he has now built and completed a score of farm-steadings, besides forming about nine miles of turnpike road from Barrhill to Bargrennan, and other four miles of private roads to the several farm-houses, as well as building five stone bridges of considerable magnitude, &c. Space will not permit full details of the reclaiming operations, but these will be glanced at further on Sufficient now to state that the Corwar improvements, have been made to the good pecuniary advantage of both landlord and tenants, and the beneficial effects upon the surrounding district, especially in respect to Barrhill village, can scarcely be over-estimated.

Considerable tracts of wet, spongy, grassy moor, amongst the hills, have also been vastly improved within the period mentioned above, by simply liming on the sward, and draining those portions most needful; and it is questionable if more good is not effected in that way, than by first exhausting the land with corn crops, and afterwards sowing down with heavy (annual) rye-grass seeds.

Ayrshire has for long borne the name of being the most humid district in Scotland. West country climate, generally, is of too moist a nature for profitable culture of cereals or root-crops. The long seaboard of Ayrshire, and prevailing westerly and south-westerly winds, with the peculiar figuration of the county, account sufficiently for its constant and extra moistness. Almost literally, " the rain it raineth every day." Yet it is not so much the excess of yearly rainfall in Ayrshire,—say one-third more than on the east coast,—as that it does not usually fall in such heavy casual plumps, but comes down in more continuous succession of steady moderate showers or thick drizzling smirrs. From this continual drip-dripping of moisture, it is only in occasional years (say one in eight or ten) that horses and implements can be put upon the clay lands to work them for green-crops, without inflicting more damage by "potching" and consequent souring, than any benefit likely to ensue. It is not merely the loss of the green-crop, but the "potching" tells most injuriously upon the succeeding white-crop, and grass as well. From most of the clays, too, resting on a close retentive subsoil, the surface mould takes longer time to dry. But "it's an ill win' that blaws naebodie gude," and the constant moistness is very beneficial for either green-crops or white-crops on what extent of light loams and sandy soils there is. More so is it beneficial to the productiveness of the grass lands (where properly drained), and which are the mainstay of three-fourths of all the farmers; if the dairy farmers, as a body, would only permit themselves to have good grass, by giving up the baneful practice of sowing down with heavy rye-grass seeds only, and regularly saving the seeds from the hay-crop.

The seasons on the West coast during the last fifteen years or so, have altered in character very considerably, and that for the worse. The winters are far milder and opener, with less frost and more rain and sleets, and what frost there is, usually of short duration. The thick dense fogs, so common on the East coast, are hardly known at all in Ayrshire: neither is snow of frequent occurrence; and what of it does fall on the low lands melts away almost immediately afterwards, whilst even on the higher grounds to the east, heavy falls of snow are but rare, compared with the inland districts of Dumfries and Kirkcudbright shires. Our summers, also, have become much wetter and colder. Formerly, extreme droughts of perhaps six or eight weeks' duration, during summer, frequently occurred, but such events now are like angel's visits, and not much missed either, as during their continuance the dairy cattle were often reduced to great straits. From the formation of the shire,—the land rising mostly in slow progression of gentle swells and rolling eminences, from sea-level to its highest altitude on the northern and eastern boundaries,—it follows as a matter of course that the larger portion of the arable lands have a western or southern exposure; and the blighting effects of the north-east wind are less in Ayrshire than in many other Scotch counties—particularly so in Carrick, where the early potatoes suffer little from summer frosts, in comparison with what they occasionally do in Kyle and Cunningham. On most of the farms the young stock are seldom brought under cover, excepting during rare times of snow; and formerly, too, the milch cows on many farms lay out during the winter months, but they are now usually housed at night the whole year round, not only because of more and better house-accommodation, but that as much manure also as possible may be got. There are an abundance of rivers and smaller streams in Ayrshire, rising all amongst the high grounds towards the east, and running a general westerly or south-westerly course, till they empty their contents into the Frith of Clyde; and these, along with the general knolliness of surface, assist much in carrying off the too great excess of moisture.

SECTION II.

DIFFERENT SYSTEMS OF FARM-MANAGEMENT—VARIOUS KINDS OF ROTATION FOLLOWED—POTATO CULTURE—CATTLE FEEDING—SHEEP FARMING—LIQUID-MANURE-FARMING, &c.

LITTLE more than eighty years ago the state of cultivation in Ayrshire was extremely defective. The implements of husbandry were of the rudest and most artless make, and the house-accommodation for both cultivators and cattle, of the very poorest kind,—so we are told. The accommodation, even yet, on some occasional farms is much behind the age, although this is more particularly applicable to the dwelling-houses on some of the smaller-sized farms. Vast improvements have been made during the past twenty-five years on out-houses generally, especially on the byres; and during the same period, much better house-accommodation for the farmer has been in very many cases provided. Small perception of the beautiful, however, has been shown in even the better class of dwelling-houses of late date. In the eyes of landlords or their agents, a farmer's house seemingly is not "the correct thing," without the orthodox frontage of five windows and a door!

Respecting farm implements, the farmers of Ayrshire, within the last forty years at least, have been always amongst the first to adopt any new improvements; and up to the present time, this county in that line has kept pace with the most advanced districts in the kingdom. Agricultural implement makers,—of reaping-machines, threshing-mills, ploughs, grubbers, turnip and mangold sowers, cheese-presses, &c.—abound; and who turn out equally effective implements, generally more simple in construction and easier wrought, of more durable workmanship and cheaper in price, than those from south the Tweed, and it is the duty of all Scotch farmers, to encourage as much as possible the machinists of their own several counties.

The roads in Ayrshire at the period first mentioned, were hardly practicable for any kind of wheeled machine, being *stunners* in the literal sense of the word; but now, these are about as good as the irregularity of land-surface will ever admit of, and there are abundance of them, crossing and re-crossing each other in every quarter. Both the turnpike and statute-labour roads will now, and for years past, contrast very favourably with those of any county in Scotland. Good roads are essential to good farming. The first step in progress of georgical improvement of any backward district is to begin and *mend its ways.* The county now is also intersected in nearly every possible direction by railroads, for conveyance of passengers, goods, and minerals, besides many miles of private lines into coal works, &c., on which lime is occasionally carried; and there is the near prospect of a further large addition being made to our railway system. Railroads certainly have been a great means of effecting improvements in Ayrshire, by enabling farmers to leave their own confined districts, and see personally how things are moving along in others, and that at little expense and little time lost. By them farmers have fit and cheap means of transit, for themselves, their agricultural produce, manures, implements, and live stock, to and from market-towns, fairs, shows, roups, &c.

The rotation for long known in Ayrshire as "the Fairlie rotation"—from Mr. Fairlie of Fairlie, near Dundonald, Commissioner then for Alexander, Earl of Eglinton—was introduced about the time stated at beginning of this section. Under it the tenants were bound to go *regularly* over their whole lands (*outfield* and *infield*) with tillage crops and grass alternately, and to sow a fixed quantity of seeds with the last corn crop. The three years under tillage might be oats, beans, or bere, intermixed in whatever way suited the tenant's interest and his land best,—a crop of hay being taken from the seeds, and afterwards resting in grass from five to eight years, according to circumstances,—so much slaked lime, or so many cubic yards of dung, being spread over the sward ere again lifting. Some time after, however, many began to see that three successive corn crops were too impoverishing, and consequently restricted themselves to two years under tillage, one year's hay, and usually not more than five or six years in pasture. This system of rotation yet prevails widely on all the *heavier* lands throughout Kyle and Cunningham.

From a "survey of Cunningham" made in 1819, the whole extent that year under turnips in Cunningham was only 358 statute acres, being at the rate of four acres of turnips to every 300 acres under tillage; so that in Cunningham, at least, and Kyle may be included, turnip-culture had not then made more than a beginning—although, in the Carrick district, doubtless, a greater proportional extent would be grown in 1819 from the larger areas of suitable land therein. Taking the county, there are presently grown about seventeen acres of turnips, as against every ninety-five acres under other tillage crops. But potatoes were cultivated as a field crop in Ayrshire, on a wider scale and at an earlier date (since 1729), than in most other parts of Scotland. The extent under potatoes in Cunningham in 1819 was 2,852 statute acres, and we safely estimate that Kyle and Carrick would have, at least, an equal amount each, so that the total acreage in Ayrshire in 1819 was fully as much as now. The agricultural statistics of 1856-57 making the average of these two years as 7,800 acres; and there has been an increase under *early* potatoes since 1857. At least two-thirds of the acreage grown in those days were known as *town potatoes*, planted on farms in near neighbourhood to towns and large weaving villages, and being the result of a mutual contract between the farmers and poorer classes of inhabitants. The reporter can recollect in his youthful days of the wide extent of potatoes thus planted in Ayrshire, and the custom was a most remunerative one to both parties concerned. Their cultivation may be said to have reached its height between 1835 and 1845, and at its maximum must have been considerably more than double that of 1819. But nearly all this was done away with after the almost total destruction of the potato-crops in 1845-46, and the large majority of inland farmers now only grow about half-an-acre or so for home consumption; although of late years, the areas under potatoes even in the inland districts have been rather expanding. The present healthy condition of most of the near-town crack dairy-farms, undoubtedly is to be traced back to the *pulverising* and *fertilising* influences of town-potato cultivation.

The wayfarer yet casually comes across fields of some 8 or 10 acres in extent throughout the interior, mostly on the river haughs of dry soil (all embanked against flooding from "spates"), but these, though usually throwing a large bulk of produce, are not so generally exempt from disease, nor can they compete in the early market with those grown more seaward. Potatoes now are confined chiefly to the warm coast lands between Largs and Ballantrae. Aided as they are by a mild moist climate, as well as superior culture, these lands are second to none in Scotland, for early and prolific growth of sound tubers. And this early potato cropping, viewed in conjunction with all its accessories, is probably the most remunerative husbandry in Ayrshire at the present time. The varieties mostly grown are *Walker's* and *Jackson's early*, *Damahoys*, *Regents*, *red-bogs*, and a few other named sorts similar to these—differing more in name than in reality. The late sorts cultivated are principally *white-rocks* and *flukes*. The growers rely chiefly on a liberal supply of farm-yard dung; and the more extensive raisers whose farms bound with the sea, have good supplies of "sea-wrack" of which every advantage is taken. All of them supplement with an allowance more or less of Peruvian guano, as their stocks of dung and need for such may be larger or smaller. The potato crops in most cases are sold *on the foot* to dealers, the farmer being at no further trouble save carting to the nearest railway station, and prices per acre vary from £22 to £26 on the earliest farms, and from £18 to £22 on those later and more inland. Early potatoes and wheat, alternately for years, were not uncommon a while back on some parts of the Girvan shore.

It was near to 1830 ere many of the inland farmers thought of trying an acre or so of turnips. As may be inferred, however, from the foregoing remarks, many in the vicinity of towns had given up the alternate grass and oats system, and gone into potato and wheat cultivation, for some considerable time prior to that date. The rotation *then* generally followed by these was somewhat as follows:—First and second years, oats (or sometimes part of one of the years, broadcast beans); third year, part fallowed it might be, but the greater part under green crops, and consisting of potatoes as the bulk, along with drilled beans, turnips, and cabbage—the beans in larger proportion, but the two others mere plots; fourth year, mostly wheat, or partly oats, and occasionally a portion of bere; fifth year, rye-grass hay—very generally (even at that time) allowed to run to seed; and finally, resting under grass for three, or four, or five, or more years, according to need and the tenant's convenience. The above description of rotation yet answers for that carried on by many of the inland dairy farmers now, excepting, probably, one or two of their very stiffest clay fields, and also that turnips with mangold have taken the place of the potatoes, and wheat alone is now commonly sown after green crop, although in high-lying districts oats still generally follow.

Probably Ayrshire has greater variety in modes of land management than any other county of Scotland. The farmers seem to enjoy considerable latitude in respect to their cropping rotations, and doubtless that is for the general good with so very variable a climate as ours. Aiton remarked fully fifty years ago, that "it is too common in Ayrshire to leave the tenant to the freedom of his own will in managing the land, provided he pays the rent punctually." Correct you were, Sir. If the tenant pays his rent punctually, he most likely is farming very well both for his own interest and that of his landlord; and so long as the rhino is forthcoming punctually on rent days, there are few landlords in Ayrshire or elsewhere who will care to enquire particularly into the system, but will wish him more success, and thank him heartily for his punctuality as well. On the earliest of the shore-lands, a four-year rotation is sometimes carried on; early potatoes wholly forming the cleaning crop, and these often followed the same year by yellow or white turnips. Still near the sea, but of rather higher altitude, the 5-year course is very prevalent, embracing two year's seeds. Although many in the sea-ward districts prefer and work upon a 6-shift—including one year's hay and two year's pasture. A 7-shift is also followed by a limited number near the shore, having two years in course under green crops—the first generally potatoes and drilled beans, the second mostly turnips, and two year's seeds. The system carried on by the coast farmers working as above, may be described as crop, stock, and dairy husbandry combined; there not being more than 5 or 6 farms in all Ayrshire managed exclusively with *fattening* stock and crops. Farther inland on the limited areas of loamy soil, the above-noted six-year rotation, viz., oats, green crop, wheat or oats, hay, and two year's pasture, obtains considerably; and the system is *almost* exclusively "dairy." A few cattle, haply, generally aged cows, being annually fattened, but the number (if any at all) varying by the success of the turnip crop. That is the case, at least, in Kyle and Cunningham, but in Carrick they feed to a greater extent. In the former divisions a ready market enough is found in the neighbouring towns, for what extra turnips or other green crop may be grown. Of late years, however, these 6-year men have been restricting the area under turnips, and letting the land rest three years in grass, bringing them, of course, into a 7-year rotation; or, otherwise, putting their lightest fields under a 5-shift, and sowing out the others as by the "old Fairlie mode." The turnips in the inland districts are invariably carted off the fields, and pitted or otherwise stored near the home-stead; indeed, sheep turnip-folding is very uncommon even on the shore lands compared with what it is on the opener and more friable rocky soils to the south of the adjacent counties of Galloway.

But a large breadth of the inland arable lands is managed on the 9 or 10 year rotation already stated (very common on the Portland estates); and most of these longer rotation men, either have some of their fields constantly under, or frequently revert to the old Fairlie method, when a field of greater tenacity comes in course, or, during times when cheese is rating high. Owing to the cycle of wretchedly wet years lately passed through, the Fairlie rotation, indeed, is presently far more in vogue than it was some 15 to 20 years back. Under these last two rotations, the system of farming is the most exclusively Dairy of all, including grass-rearing of young Ayrshire cattle; the turnips, potatoes, cabbage, &c., of the "Fairlie" men, being usually a mere patch in one of the fields, and no more oats being grown than will yield the necessary supply of winter fodder; whilst on the 9 or 10 year rotation farms, the manured green crops, on a farm of say 120 acres, will vary from 4 to 12 acres in different seasons. And, although there are individual cases where one white crop is only and regularly taken out the lea, even after four years pasture, yet the practice of taking two successive white crops in beginning the course, is by much the most common. The lea-land, of course, is generally pretty well top-dressed previous to lifting. There are doubtless other rotations, as well as modifications of those noted, in such a large county as Ayrshire, but from what has been said, and what immediately follows, any intelligent stranger farmer may form a tolerably correct idea of Ayrshire land management. It is corn *versus* milk that the dairy farmer has to decide on, and he must be, and is, much influenced in his mode of cropping by the relative state of the markets for each. The interests of the landlord and tenant are one and inseparable (or ought to be), and it is worse than folly on a landlord's part to bind down a dairy-tenant to grow a large and fixed area of roots annually. Beans, maize, and other feeding-stuffs, are now so plentiful and cheap, that the dairy farmer is much less dependent upon roots for house feeding.

The following are a few examples (condensed) of various systems of farm management in the more advanced districts; and although those mentioned are all fair specimens of the Ayrshire husbandman, yet there are scores of others equally as good,—we cannot say better. These will give a fair idea of the farming chiefly in the shore districts, whilst the exclusively dairy systems are more fully noticed in other parts of the report. The farm of Chapelton, tenanted by Mr. David Cuninghame, and belonging to the Earl of Eglinton, is situated on the coast south of West Kilbride village in Cunningham division. Extent, 250 imp. acres arable land, and 25 acres permanent grass. Chapelton is managed upon a 5-year course—oats, green crop, wheat, and two year's pasture. The green crop is almost entirely early potatoes, and a crop of turnips is taken the same year on the same land after the potatoes are lifted. The soil is of a light quick nature, and having a good supply of sea-weed, the crops can be forced. The sea-weed is collected off the tide, and ploughed into the soil immediately after or as soon as possible. The ground is again ploughed early in spring, and 5 cwt. per acre of peruvian guano applied when the potatoes are planted. Mr. Cuninghame's land is thoroughly clean of "couch" and quicks," and the sea-wrack thus applied makes an excellent manure for early potatoes. Kind of wheat sown is usually either "woolly-eared" or "Hunter's white," at the rate of 3 bushels per acre, and about the end of November preferred for time of sowing. No barley to speak of grown in that district. On the higher parts of the farm turnips alone are grown as the cleaning crop, and a small lot of cattle fattened with them during winter. A dairy stock of 20 cows are kept, rearing nearly all the calves, and, as soon as they are off the milk, cheese-making begins. The young cattle, along with a small "hirsel" of Leicester sheep, are grazed upon the upper portion of the arable pasture, and the 25 acres permanent grass,—the lambs off the ewes being sold for early slaughter. Mr. Cuninghame took a prominent part in the recent introduction of the Cheddar mode of cheese-making, and, indeed, although more limited in extent of land than many, he has always occupied a foremost place amongst Ayrshire agriculturists. The 5-year rotation is pretty general on all the low lands between Ardrossan and Largs; a large breadth of early potatoes being planted, and the farmers mostly growing only a small acreage of turnips, &c., for the dairy cows, as few cattle or sheep are fed, except on the two or three farms where regular sheep stocks are kept. On the colder clay soils to the north-east of West Kilbride, and round by Dalry, Beith, the higher parts of Kilwinning, and Dunlop, the Fairlie system of two white crops and six year's grass, is by much the commonest.

Mr. James Reid occupies the farm of Torcross (Paterson of Montgomerie,) near Tarbolton, situated 4 miles inland in Kyle at an altitude of about 200 feet. Extent, about 175 imp. acres arable. One half of the farm is light dry soil, resting on a kind of rotten whin, and the other half a strong clay. Mr. Reid has wrought the whole farm for a long time under the 6-year rotation, including one year's hay and two years' pasture, with oats fore and aft the green crop—no wheat being grown; but latterly he has begun to put his light land into the 5-shift, and sowing down the clay fields after two white crops, to lie always 6 years in grass, or more as may be expedient. The green crop break at Torcross is composed nearly as follows:—Fully ½ acre mangold, fully 1 acre cabbage, about 4 acres drilled beans, 30 inches wide, with 30 carts dung per acre, fully 6 acres potatoes, half "earlies" and half "rocks," planted about end of March, and manured with 40 carts dung (about 28 tons) and 4 cwt. peruvian guano, per acre (scots); the rest is in turnips, manured with 30 carts dung, and 6 cwt. bones and guano per acre (scots). "Tam Finlay" oats only sown, and about the middle of March time preferred for sowing. About 20 milch cows kept, the produce turned into cheese, and 10 calves reared. 6 or 7 swine fattened annually—fed on whey, turnips, potatoes, and ground corn. No sheep stock kept.

Mr. Reid—as well as his brother lately in Scoutts, now in Largs farm, beyond Ayr—is well known as a rearer of good Ayrshire cattle; and, indeed, there are several around Tarbolton rather famous in this respect,—such as Mr. Meikle, Brownhill; the Messrs. Meikle, Clockstone, and Mr. Hugh Wilson, Outmains, &c. To the east and south-east of Tarbolton, by Mauchline, Sorn, Stair, Ochiltree, &c., the Fairlie system greatly predominates.

Shields—possessed by Mr. R. M. Cuninghame, and the property of A. H. Oswald of Auchincruive—extends to 275 imp. acres arable, and lies from 2 to 3 miles inland in the low and fertile parish of St. Quivox in Kyle. This farm has been long noted as being always forward in high agricultural practice, under old Mr. Tennant of Girvan Mains from 60 to 70 years ago, as well as under his son, the late John Tennant of Creoch, and the present holder's late father, Mr. Wm. Cuninghame. The soil is all what is commonly termed light land; a large portion being a weakish grey sandy-loam, and the remainder good red-coloured mould, with a gravelly sub-soil chiefly. The principal defects of Shields are, that it is easily affected by summer droughts and frosts, and ill to keep clear of "couch" and other creeping roots. It is under the 5-year rotation. Barley occupies about one-third of the break after green crop (say 18 ac.), sometimes "chevalier," and sometimes the "common" or "Scotch," the latter being most thought of by Mr. Cuninghame. The wheat sown now is nearly all "Hunter's," as the finer-sampled varieties were diseasing greatly, and one-half is usually drilled in with a machine at the rate of 2 bushels per imp. acre, the rest being sown from hand at 3 bushels per acre. The drilling is preferred by Mr. Cuninghame, and will be extended for the future where practicable, as it not only saves seed, but the plants keep the ground better during late frosts in spring. Only about one acre of carrots are now grown, mostly of the "white" variety, as the "worm" has become rather destructive at Shields, and affects the red kinds more. If present prices of grain continue, Mr. Cuningham means—we believe has already begun—to allow 10 acres of the oat-break to lie a year longer in pasture, taking potatoes after the oats, and sowing out with barley, which will be easier for the land, and require less manure (a 6-shift, with 3 years grazed.) Presently one-half the first year's seeds is cut for hay, and the other half grazed.

Sixteen milch cows are kept at Shields, and as many calves reared, which consume a good portion of the milk during the first two months, as they are brought up for feeding purposes, and therefore better attended to. This season (1865), Mr. Cuningham intends substituting linseed-meal and oatmeal for part of their milk diet, which, with present prices, should prove a prudent course. The bulk of the dairy produce is turned into "cream-butter," and the skimmed-milk either converted into "skim-cheese" or given to the pigs, of which about a dozen are annually fattened. Off or on 40 head of cattle are annually fed for the butcher. About 150 lambs (principally "crosses"—Leicester ram and black-faced ewe) are purchased every year in the month of August—put upon the hay-foggage first, also getting a few weeks picking on the young grasses when the crops are removed —fed during winter on pulped-turnips and draff, together with a few oats, and as much hay as they can consume; and, finally, they are washed and clipped in the month of May, and sold fat during June and July. Mr. Cuningham means to increase the number of hoggets, and give additional feeding, so as to do away with the necessity of light manures to the oat crop.

Balsaggart Farm (Sir James Fergusson, Bart., M.P., of Kilkerran), is in the occupancy of Mr. John M'Clymont, and lies on the east side of the Girvan river, south of Crosshill village in Carrick, 8 miles inland and about 11 miles up from Girvan. Extent in whole 350 imp. acres; but 50 of which, after draining, were sown down permanently, and are now in grass. The soil is all of a light nature, but moist, although all drained. The 300 acres are worked partly in a 5-shift, and partly in a 6-shift —that is, when a hay-crop is taken, other two years following are pasture, but when the first year from seeds is grazed, only another year's pasturage ensues, and then broke up with oats. Green-crop all turnips, saving 7 or 8 acres in potatoes. No barley is sown so far inland, and wheat usually follows the green-crop; but wheat in the Crosshill district, from the bad seasons of late, is fast going out and oats being sowed instead. Wheat used to average with Mr. M'Clymont about 4 quarters per Scots acre, but for many years bygone it has not averaged above 3 quarters (Scots), and the price only 34s. Balsaggart truly affirms, that, " arable farming has been a very unprofitable investment for several years, and unless prices and seasons greatly change for the better *very soon,* a complete turn over of the farmers in that district may be looked for." From the great increase of game (hares and rabbits), carrots are not now grown.

A dairy stock of 25 cows is kept at Balsaggart, served with a shorthorn bull, and timed to calve in February or March. The cross-calves are all reared, and about other 8 quey calves (Ayrshires) bought in to keep up the cow stock. These 33 calves get all the milk, with oilcake, till about 1st June, when the manufacture of cheddar cheese is begun,—the calves receiving cake for another month without milk. The calves are wintered on cut turnips and linseed-cake, and pastured next summer till September, when they are sold for feeding off in their second winter (rising 2-years old.) Mr. M'Clymont himself feeds his aged cows, a few of the " shot" young stock, and one or two more—say 20 in all; and besides, about 200 half-bred hoggets (Cheviot and Leicester), are purchased in August, and sold off fat about May following. An effort was made about 1847 by the famed " St. Quivox Club" of that time, to introduce the shorthorn breed more generally amongst feeders, but it failed in producing any effect, as shorthorn crosses are now more difficult to procure than formerly. A sweepstake competition in shorthorns was held at Ayr on 5th January 1848, when 12 bulls and 3 heifers came forward, and Mr. Stevenson, of Redside, Linton, awarded the prizes thus :—first for aged bulls—the late Mr. John Gardiner, Monktonhill; first for young bulls—Mr. John M'Clymont, Balsaggart; and first for heifers—Mr. George Hendrie, Highfield (now in Craig, Straiton); but so far as we are aware, the only shorthorn bulls presently in Ayrshire, is the one at Balsaggart, another at Woodlands (Mr. William Wright) near Girvan, and one lately brought into the county by J. N. Fleming, Kilkerran House, Maybole—three in all. The last named gentleman since taking up his residence in Ayrshire has engaged most energetically in farming pursuits, having leased the farm of Drumburle on the Girvan, and all the land around Kilkerran House; and his personal competition, along with his hearty liberality in offering money prizes for the best stock of all kinds, have been most animating to the farmers of Carrick.

Halfway between Troon and Monkton in Kyle, and fully one mile inland, lies Monktonhill, possessed by Mr. John Hamilton, and the property of the Duke of Portland. Extent 380 imp. acres; 300 acres, a deep fertile sandy-loam, and the rest of a lighter sandy soil. Formerly a part of the farm was wrought on a 4-year course, but the 80 acres of sand lying in grass becoming fogged, Mr. Hamilton is now ploughing it up, and putting the whole farm under the prevailing 5 shift. Monktonhill is looked upon as one of the best arable farms in Ayrshire, and has long got every justice done to it, both under the late Mr. Gardiner, and the equally skilful management of the present lessee. The lea-break is entirely oats, and wheat alone follows the green-crop. The green-crop break consists of 40 acres in turnips, 30 in potatoes, and 5 in mangolds. One year with another the turnip-crop will average about 20 tons per imp. acre, but the farm is rather subject to "finger-and-toe;" one-half Swedish, sown the last week in May, and the other half green-top yellow, sown about the second week in June. The "young grasses" are entirely grazed by hoggs, only so much hay being made as serves for the home-stock; and the second year from seeds by the dairy stock of 21 cows, and from 50 to 60 head of young cattle *over summer* besides. From 12 to 16 calves from the milch stock are reared each season. Mr. Hamilton feeds off for beef 50 head of cattle annually, and about 250 sheep generally are kept for "hogging." He consumes all his straw on the farm, besides purchasing largely of feeding stuffs, guano, bones, &c ; and upon the whole, Monktonhill may be taken as a crack example of the pure 5-shift course, including the Ayrshire feeders' custom of keeping small dairy stocks. Many of the feeders, however, do not work the milch cows themselves. Such well-known men, for instance, as Mr. R. Guthrie, Crossburn, and Mr. A. M'Caw, Morriston, feed largely at their homesteads, and let out their milch cows "abowing" on out-steadings; the former turning out from 60 to 70 fat beasts, and about 250 sheep, annually, and having some 90 milch cows let out in three separate "bowings." Besides Monktonhill, Mr. Hamilton holds the farm of Springside (130 acres), in Dreghorn parish, from Lord Eglinton. This out-farm is managed much similarly to Monktonhill—excepting that, the first year's grass is all cut for hay.

North-east of Monktonhill by Symington, Craigie, and Riccarton, parishes, green-cropping was pretty generally attempted till of late, and is still by not a few although in smaller extent; but more land thereabouts is now being sown down with a second crop of oats, and whether green-cropped or not, a "seed-hay" crop is generally taken, and lying in grass afterwards from 2 to 5 or 6 years. The same remark holds good in respect to the parishes farther north—Kilmarnock, Kilmaurs, Dreghorn, Stewarton, and Fenwick.

Trees farm (including Bogside and Howmuir) is tenanted by Mr. John Cunningham, and belongs to the Marquis of Ailsa, K.T. It is situated 1½ miles north-west of Maybole on the southern slope of Brown-Carrick-hill. Extent in all 769 imp. acres—viz., 325 acres under rotation, and 444 acres hill pasture; although the latter, excepting 50 acres, had been cropped prior to Mr. C's entry. The soil is various, part a deep rich loam, part light soil with a whinstone bottom, and a large portion of a blackish soft nature 125 acres of the best land under rotation is divided into six enclosures:—Two in green crop (one turnips, the other potatoes); three in white crop (one sown out); and one in hay or pasture. The rest of the arable land is under the usual 5-year course. About 80 acres are thus annually in green crop, consisting of 20 acres potatoes, fully 2 acres mangolds, and the residue turnips. Manuring:—The lea-break in the 6-shift (if thought needed) top-dressed very lightly with Peruvian guano. For potatoes, about 24 good cart-loads of dung, and near, to 6 cwt. Peruvian guano, per Scots acre. For turnips, as far as the farmyard dung goes—say 15 carts, 12 bushels crushed bones, and 1½ cwt. each of Peruvian guano and dissolved bones mixed; or, for turnips without dung—20 bushels crushed bones, and 2½ cwt. each of guano and dissolved bones mixed, per Scots acre Two-thirds of the turnips swedes (Skirving's.) Half of the soft turnips eaten on the ground; the swedes stored, and cut in the spring months for the hoggs. No barley is grown, and as a large part of the soil is not adapted for wheat, only about one-half the green crop break is annually under that cereal, the finer sorts being preferred, such as white-Essex, &c. Wheat after potatoes, in Ayrshire, is generally a better crop than after turnips, and we notice that wheat always succeeds on the potato land at Trees, and sown early in November. What of the turnip land may be adapted is sown about the beginning of February—if possible. Seeds at the rate of 4 bushels per Scots acre, sown from hand. "Potato" and "black tartarian" oats are usually sown on the best land—the latter variety yielding well, and considerably thought of in Ayrshire. The other kinds sown are "Tam Finlay" and "red" oats—the last on the blackish land from its stiffness of straw. About 30 acres of the young grass is cut for hay—the remainder being grazed with hoggs. No dairy cows are kept, and consequently no swine fed—saving perhaps a couple. Mr. Cunningham being one of the two-three farmers in all who depend entirely upon cropping and *fattening* stock. From 70 to 80 head of cattle are tied up (no "boxes") in autumn. These are a mixed lot, all purchased (if possible) in the county, and consisting of Ayrshire bullocks and queys (3 and 4 years), and 2 or 3-year old "crosses" (Galloway and shorthorn, or Ayrshire and shorthorn). The crosses are preferred, but to get many of them Mr. Cunningham, as well as other large feeders, is often obliged to attend and buy at one or other of the large east-country autumn trysts, although in doing so there is considerable risk of disease. For the first two months the cattle get as many turnips as they can consume, then about 2 lbs. each daily of beanmeal and bruised cake mixed is begun with, which is increased gradually, till for the last 5 or 6 weeks they, are receiving about 6 lbs. each daily. The meal is diluted with boiling water about 24 hours ere using, and is given in the form of a ball to each. If turnips seem short in spring, one feed daily of these along with cut straw or hay and chaff, and a little meal, cooked together, is allowed. This saves roots, and the cattle are very fond of it, but it costs a trifle more for coals, &c.

On the hill pasture Mr. Cunningham keeps about 15 score blackfaced ewes, crossing with Leicester rams. The lambs, about 320, are kept on, well harvested on foggage, and then put on turnips with a few oats. They get a portion of the young grass and the other pasture next year, are clipt, and two-thirds or more (the "tops") are generally sold fat in June and July. The others ("shots") are again put on turnips and oats, and sold in January or February following. Certain extents of foggage and turnips to aid in harvesting and wintering some of the young sheep, have to be taken by Mr. Cunningham on smaller farms in his vicinity on which no sheep are kept. Like Trees, very many of the Carrick farmers have more or less of green hill pasture attached to their arable holdings, and which, particularly in these times, is of great advantage to them.

We should have liked to have noticed somewhat in detail the general management of Mr. Bryce Wright at Dowhill, a few miles north of Girvan, but space will not allow more than a glance. The shoreland on Dowhill is wrought on the 4-year rotation, *early potatoes* alone forming the green crop, and this applies generally to the whole Kirkoswald and Girvan shores. Further inland in these parishes the 5-shift greatly obtains, and in Girvan parish, as also in that of Colmonel to the south, most of the farmers hold hill lands adjoining. Mr. Wright is decidedly the most successful raiser of potatoes in Ayrshire, and is generally first in the Glasgow early market, which is a great point gained. Kind cultivated, "Dalmahoy." Manure applied, 30 cart-loads well-pulverized farm-yard dung (equal to 21 tons or fully), 3½ cwt. Peruvian guano, and 3½ cwt. dissolved bones, per imp. acre. 13 cwt. of seed planted per imp. acre. Width of drills, 26 inches. Of course Mr. Wright uses "sea-wrack," but what of that he obtains only serves for a small part, from the large acreage grown, often 60 acres and upwards. Mr Wright, like his neighbour Mr. M'Tier in Girvan-mains, and one or two others (Mr. Q. Bone, Greenan; Mr. J. Meikle, Nether Mains, Kilwinning, &c.), is exclusively in the feeding and cropping line, keeping only one milch cow for home use, and rearing no calves. He spares no cost in procuring the most approved stock for putting up,—pure shorthorn oxen and heifers, largely, and half-bred sheep,—and enjoys considerable celebrity as a feeder. Part of his cattle are fed in boxes and open sheds.

Before leaving the subject of "fattening cattle," the reporter may observe that, a good many of the inland farmers occasionally *grass-fatten* one or two cows each, a small field of pasture being "hained" for that purpose.

The land around Girvan and for 3 miles up the water is very early, and probably the best soil in the county, considering the quantity of rain they enjoy thereabouts. The soil is mostly dry light mould, resting on a gravelly subsoil. A wide extent of early potatoes are raised in that quarter, and succeeded now in very many cases by barley. Higher up the water, between Bargany (Duchesse de Coigny) and Kilkerran (Sir J. Fergusson, Bart.), the valley is greatly shaded with wood, and much of the land under fine old pasture, realizing thus fully as much, probably, as if let for tillage purposes. The high grazing lands to the east of the vale of Girvan, in Dailly, Kirkmichael, and Straiton, parishes, are stocked either with Cheviot or blackfaced ewes, and these served with Leicester rams, or, in some cases, with what are called Yorkshire rams,— a larger boned sheep, and throwing stronger lambs.

Mr. Andrew W. Ralston occupies the farm of Lagg (Lord Ailsa), situated on the Maybole coast, about 5 miles south of Ayr. Extent, 325 imp. acres arable, and 190 acres hill-pasture. Soil of the low lands generally a good strong loam with stiff clayish subsoil, and the higher arable lands of a lighter loam similarly bottomed. 50 acres of the low land are under liquid-manure irrigation, of which more anon. The rest of the lower lying land is managed on a 7-shift—viz., (1) Oats out of lea; (2) Green crop, mostly potatoes, with drilled beans on the heaviest portions of soil; (3) Wheat; (4) Green crop, mostly turnips; (5) Wheat, sown out; (6) Young grass or hay; (7) Pasture. The lighter soiled fields next the hill are under a 6-shift—oats, turnips (partly or wholly "fed off" growing with sheep), oats, and 3 years pastured. Mr. James Todd, Dunure Mains (Hon. T. F. Kennedy), a mile or two farther along the coast, manages with precisely similar rotations to above, but often substitutes barley for the second wheat crop, as many of the Carrick soils (and Carrick farmers also, haply) are becoming "wheat-sick" from a too frequent recurrence. The young grasses are always better after barley, and, should climate more permit, its larger substitution for wheat would be a step in the right direction. Mr. Young, of Highfield, Mr. Wright, of S. Sanquhar, and others in St. Quivox parish, by skilful and wary management can grow it successfully, and many more might do the same with like soils. Mr. Ralston's manuring for green crops generally under his ordinary rotations is—25 good carts of farm-yard dung, 5 cwt. dissolved bones, and 2 cwt. Peruvian guano, per Scotch acre. And the farm-yard manure at Lagg is unusually good, from a large number of pigs being fed upon the dung-stead. The dung-stead, however, is not covered. We only know of 3 cases of "roofed in" *steads* in Ayrshire, although, of course, manure made under cover in sheds and straw-yards is very common. The covered dung-stead at Kincaidstone, the property of James Morton, Esq. of Belmont, is an admirable instance of the utility of this sort of thing. The kinds of wheat sown at Lagg are—Drewitt's, woolly eared, Archer's prolific. Kinds of oats sown—potato, Canadian, Tam Finlay, black Tartarian. 27 milch cows are kept, but only half a dozen or so of the quey calves reared to hold for stock. The fatting cattle are of all kinds (excepting "Irish"), but young farrow Ayrshire cows and shorthorn crosses are preferred; the latter mostly so, if they can be procured at a reasonable price. The beasts are mostly tied up, but the young ones generally in loose boxes. Cheviot ewes crossed with Leicester rams are maintained on the hill, and the lambs fed off on turnips, &c.

On the 50 acres of low land, the diluted cattle-urine manure is distributed by gutta-percha hose screwed on to stop-cocks in the iron pipes which convey it from the steading, placed at convenient distances throughout the four fields. All the urine and waste liquid of every sort goes into the tanks, and they hold about 70,000 gallons. The fall for some distance from the tanks is very little, but gradually increases, till just above the low ground the liquid descends about 80 feet. In spring the liquid is diluted about half and half with water and in summer about ⅔rds water to ⅓rd urine. The 50 acres are worked on a 4-shift—viz., (1) Italian rye-grass, sown with the wheat crop about the middle of April, at the rate of 3½ bushels of seed, along with 2lb. each of red and alsyke clovers, per scotch acre. (2) Broadcast beans, without manure. (3) Green crop of sorts, manured with nearly 40 carts of farm-yard dung, 2 cwt. Peruvian guano, and 4 cwt. bones, per Scotch acre. (4) Wheat, without manure. Only the Italian rye-grass break gets liquid-manure, so that each field comes in for its turn of irrigation once in 4 years. In seasons of sufficient warmth of sun, 4 good cuttings are taken from at least part of the Italian break, and 3 off the remainder; and Mr. Ralston estimates the average of *green grass* obtained each year per *Scotch* acre at about 25 tons. From the appearance of the crops of Italian which the reporter has seen growing at Lagg now and again, *he* would have estimated the yearly yield fully higher than what Mr. Ralston does, but of course Mr. Ralston knows best. In good season, 6 head of cattle are fattened to the Scotch acre of it, or 60 head to the break, besides the dairy cows and horses occasionally getting a little. They are "soiled" from May till end of October, but receive at same time a little oilcake (more or less to each as may seem necessary) at night, and always an allowance of oat fodder, although they do not appear to care much for it. As auxiliary to the liquid, from 1 to 1½ cwt. of peruvian guano or sulphate of ammonia, per Scotch acre, is applied to each cutting, and washed well in with the liquid from the pipes immediately after.

The liquid-manuring at Lagg was set agoing about 15 years ago by the present Mr. Ralston's father, the late Alex. Ralston, Esq., Dunduff, than whom a more intelligent farmer or gentlemanly man Ayrshire never produced. It was the first instance (we may say) of the *profitable* application of "cattle-urine-manure" by pipes and hose for soiling purposes in Scotland. But of later date, equal areas of low land have been under almost exactly similar treatment on the farms of Greenan (Mr. Quintin Bone) and Drumshang (Mr. John Craig), both also on the Maybole coast. Mr. Bone, we believe, has a fully larger area laid with pipes than at Lagg, and is also well deserving of notice for his general good management. These cases of "high-farming" are all carried on to good pecuniary advantage. Most other instances of the kind that the writer has heard of were always at the landlord's risk, but Messrs. Bone, Ralston, and Craig, are merely tenant-farmers, shrewd business men all, without a bit of "fancy" material in them, and by whom it must be and is made to pay—paying as they do *at least* £3 per imp. acre of rent for their low lands, and interest as well on the outlaid money for tanks, pipes, &c.

The present tenant of Myremill (Mr. Duncan) only uses the pipes on a small low-lying holm of some 8 to 10 acres, keeping a large stock of dairy cows now on Myremill, and feeding also to certain extent. Myremill "high-farming" was certainly a failure in a *financial* point of view. Probably the chief cause of that was, the endeavour to convert most of the solid excrement as well into a sort of fluid state, and force the whole through the pipes by steam-power. The dispersing power used at Lagg, &c., it must be remembered, is simply gravitation. But Mr. James Kennedy deserves very great credit, at least, for originating the system at Myremill on a grand scale. He had many difficulties to contend with that do not now present themselves, and few farmers in Ayrshire or elsewhere could have stood alongside of Mr. Kennedy for equal tact and ability in carrying on a business so extensive and complicated. The Ayrshire men noted above,—as well as Lord Kinnaird, at Millhill, and others,—all had the benefit of Mr. Kennedy's experience, and doubtless profited thereby.

In the previous section was noticed, generally, Mr. Wason's improvements at Corwar. We give here an instance of what can be done by a tenant-farmer, unaided, in reclaiming and improving of waste moor, and bettering his own condition and that of his family at same time. Mr. David Hutcheson took the farm of Ducharneil (Hamilton of Pinmore), near to 40 years ago. It lies on the water of Muick, in the north of Colmonell parish, and at that time was just a very middling sheep walk, all covered with heather and with hollow places of "sprotty" ground, excepting some 10 acres of holm land. Extent, 400 acres, all light land, near the till, with a greyish (mossy) top. Draining ought to have preceded by a year or two, as is done by Mr. Wason on his lands further south; but draining was not thought of then, and Mr. H. just began and ploughed one field after another till the whole was gone over that the horses could go upon. The heather was ploughed down in spring with as thin a furrow as possible, and about 10 inches broad, the land spread with warm lime at the rate of 8 to 9 tons per acre immediately after, and again ploughed before winter, running the same furrow about as deep again as at first—say 6 inches. Two crops of oats were taken, and the land sown down to grass, the third ploughing with a still deeper furrow—say 8 to 10 inches. About 15 years ago Mr. Hutcheson had a good part of the farm drained with Government money, and green-cropped it afterwards, but finds now that that part will not keep nearly the stock which it did under the first simple improvement. He does not blame the draining, of course, but the green cropping; being of opinion that green cropping in Ayrshire hilly districts with greyish-topped soil is harmful to the subsequent pasturage. This is a very common complaint with Ayrshire farmers generally. But we suspect that the main cause of the disappointment, with Mr. Hutchison and others, is the practice of sowing down the land nearly wholly with rye-grass seeds, and preserving the seeds from the first year's grass. Green-cropping does of course kill the roots of the *natural* grasses and plants of the soil, and unless the seeds of plants peculiar to the soil of the district to be sown down, or of others equally well or better fitted, be supplied, the land afterwards will be barer of plants than before. We quite concur, however, with Mr. Hutchison, that green-cropping in most inland districts of Ayrshire can only be profitably carried on to a *slight* extent; and his system of breaking up only once in ten years with two oat-crops, and again laying down to grass, is probably as good as could be adopted. Sow down, however, with proper seeds, and take no seed-crop. Thirty milch cows are kept on Ducharneil, and their produce turned into cheese, excepting what of it goes to 20 of their progeny reared and grazed till 2½ years old. About 4 score of blackfaced ewes are also kept on the farm, and served with Leicester rams. Half a score of swine are annually fattened off. Mr. Hutcheson and his sons now hold other three farms besides Ducharneil—two of them sheep-farms from the Earl of Stair, in New-Luce parish, of 1600 acres area; and the other, Balhamie, near Colmonell, on the Stinchar, from Cathcart of Knock dolian. The latter is of about 400 acres; the low ground, deep alluvial soil, being wrought on a 4-shift rotation, with dairy cows grazed on the upper pasture, and about 12 score of ewes on the hill, taking cross-lambs same as at Ducharneil. Mr. David Hutcheson is an example of a numerous class amongst the Ayrshire tenant-farmers who have raised themselves to good social position by their honesty, perseverance, and most industrious habits.

Were it necessary, other instances could be cited of wild moor being reclaimed by much similar modes of procedure as at Ducharneil, but not entirely within the period of 25 years, allowed by the "Highland Society" to report progress in.

We may note, for one, the many and varied improvements of H. S. James, Esq. of Martnaham, on Martnaham Moor (Craigs o' Kyle), executed within the past 15 years.

Little that is new can be written on the purely pastoral farming around the outskirts of the shire. Ayrshire ranks the eighth in importance as a sheep county in Scotland. When Aiton wrote in 1810, the Cheviot breed was merely then being introduced into Ayrshire, and many experienced sheep farmers predicted at that time, that they would never do for this county; but of late years, on all the lower-lying and grassier hilly lands at least, they have greatly superseded the blackfaced aborigines. This may be owing partly to the greater profitableness of the Cheviots, but also, no doubt, to surface-draining and liming of rough "spretty" land, the providing of shelter and warmth from judiciously placed belts of planting, and the vastly greater supply of turnips now for winter keep, having rendered the county better adapted for them. Extensive tracts of bleak, wet, mossy heath-land, exist, however, on which the blackfaced will always be the most advantageous breed. Great improvement, doubtless, has been made on the blackfaced sheep since Aiton wrote, and which has been effected by judicious selection and crossing within the breed itself. Much of this improvement must be placed to the emulation excited in the leading sheep-farmers by the annual shows of the "Ayrshire Agricultural Association."

Almost all the sheep-farmers keep dairy stocks. We instance one well-known and esteemed gentleman, who is just about to retire from public life—viz., Mr. Andrew Mitchell, Linfairn. Mr. Mitchell occupies two sheep-farms near Straiton, stocked with Cheviots, but holds ten times as much land, or more we believe, in

Inverness-shire, Ross-shire, &c. Linfairn keeps a dairy of 20 Ayrshire cows, rearing all the calves, and a few more generally, which get as much milk as they can take for three or four months, when cheese-making begins in the latter part of the season. Only a few of the old cows are fed; and the rest of the turnips are given to the young cattle and hoggs in winter, when the grass fails in January or so. About 140 acres are arable around Linfairn House, but only 90 acres of it tilled, of which 15 acres are broken up yearly.

On the hilly tract to the east of Largs parish, a mixed system of sheep, meadow, and dairy farming is followed. The sheep-stocks in general are blackfaced, crossing in many cases now with Cheviot rams. The large farm of Outerwards, however, north of Largs, and one or two others, are stocked with Cheviots. A fifth part of the old ewes on most of these farms are sold about the end of September to low-country farmers, who fatten them off for the butchers; a corresponding number of lambs being kept as holding stock. On some, however, wedder stocks are kept, usually sold off at 3 and 4 years old. The "hoggs" are regularly sent down to some low-country dairy grass farm for wintering, at varying rates per head according to quality of keep; and that is common with all the sheep farmers round about. Large dairies are wrought by most of these sheep men in the north-east of Cunningham; there being good demand and high prices for butter during summer, at the adjacent "watering-places" of Largs, Fairley, Millport, &c. The cows are wintered chiefly on "bog-hay," of which large crops are secured; many of these farms not growing more than a couple of acres or so each of oats and turnips. The climate of that corner of Ayrshire is extremely wet, and it is generally the middle of September ere the hay is all safe, whilst the oats are often not even cut down at a later date.

The majority of Ayrshire sheep-farmers now are "dipping" the sheep instead of "smearing;" olive oil being used in some cases along with the "composition" for improving the wool. The principal sheep, lamb, and wool, fairs, in the county, are at Dalmellington, Barrhill, and Auchinleck, towards the end of August.

The reporter cannot close this section without taking notice of his near neighbour, Mr. Robert J. Thomson, Grange, Kilmarnock. This gentleman of late years has opened up quite a new path in the way of "field experimental farming," which Professor Anderson has advocated very strongly, and is now making all his calculations on the hints thrown out by Mr. Thomson. The apparatus and arrangements of sorts at Grange are most complete, and probably not equalled for effectiveness in the kingdom. Mr. Thomson's general system is purely "crop husbandry," with a frequent and liberal use of artificial manures, but space will not permit to enter into details. It is besides quite exceptional to the common run of dairy-farming around Kilmarnock.

SECTION III.

Brief Remarks on the Cereal, Leguminous, Root, Flax, or other Field Crops Cultivated—Summer Fallowing—Ploughing—Harvesting, &c.

The potato crop has been sufficiently handled in the preceding section. Ayrshire is, however, considerably behind the other western shires in comparative extent under potatoes. Relatively to the total acreage under tillage in each:—Renfrew has one-sixth part in potatoes; Argyle, one-seventh; Dumbarton, one-eighth; Bute, one-tenth; Lanark, one-eleventh; and Ayr, one-fourteenth only. In the same relation, Fife has one-ninth part; Perth, one-tenth; and Haddington, one-twelfth. Glasgow market accounts chiefly for the extensive cultivation on the west coast.

The total acreage under turnips in Ayrshire seven years back was about 17,000 acres, and contrasting this with that grown in the chief turnip district of Scotland—viz., Berwickshire on the opposite coast, the latter county has three times as much land under turnips proportionably with the total acreage under rotation, and double the extent looking to the land under actual tillage in each. But Ayrshire is no worse than some of her neighbours like-circumstanced, as both Lanarkshire and Renfrewshire grow a less proportional acreage. The shortness of turnips in the inland districts, which will yet be more insignificant unless seasons mightily change, is not owing to any deficiency on the part of the farmers in the art of cultivation, or to an insensibility of the value of that crop, but soil, and especially climate, will not permit. And it is no great drawback to the dairy farmers that they cannot grow large breadths of these. It would be more profitable for many of them to grow even less than they presently do, and work and manure the smaller areas more sufficiently. On the lighter lands along the coast, as good turnips, and in as great proportional breadth, can be seen, as in the best farmed districts of Scotland, and which are put to as profitable use in feeding of either cattle or sheep.

Broadcast *beans* are sometimes substituted for one of the oat crops in beginning the course by the 9 or 10-year rotation men. They are commonly taken out of the lea, as a good crop of oats can almost invariably be depended on after, and oats after *old* lea are apt to be injured by "worming," or if they escape the worm, are apt to lodge. If the land is to be sown down again without being green-cropped, the beans must, of course, come in first.

The writer has noticed, these some years back, considerable areas under a *maslin* of beans and oats, and which seems a very judicious way of growing both for home use. If the beans are attacked with disease, an extra produce may be relied on from what oats there are, and so the one helps the other; but oats are always stronger in straw and panicle, comprising more seeds, when grown in mixture with beans. An instance of a drilled-maslin of this kind grown at Struthers, near Kilmarnock (Mr. James Sturrock), is worth notice. The field, about 14 acres of good strong loam, had lain the usual 4 years in grass, and was broken up in spring 1863 with oats, having been previously well top-dressed with dung. Early in November the stubble ground was thrown into drills, about 27 inches wide, by the single-wrested plough laying up furrows of 7 or 8 inches depth the one against the other. Thus laid up, if a wet winter should ensue, the soil is kept much drier, and does not sour; if, on the contrary, a long hard frost should set in, as was the case in winter 1863-4, the frost acts more effectually on the surface soil, both vertically and laterally, and also into the sub-soil at the bottom of the drills. In spring 1864, the drills were broken down with the bow-harrows, sown broadcast with about 2 cwt. per acre of artificials, 2½ bushels oats and 2 bushels beans per Scots acre, and the seeds and manure covered in by splitting up or reversing into new drills. The new drills sometime after were broken down with the bow-harrows, grubbed and ploughed-up, and finally rolled flat with a heavy stone roller; and when the plants were from 2 to 4 inches long, the spaces were grubbed and worked as with ordinary green crop. The result has been a very good crop, both of straw and grain. It would have been better, however, with fewer oats and more beans sown, say nearly 3 bushels beans to 1½ bushels oats per Scots acre, and Mr. Sturrock intends to adopt that measure with another field laid up in like manner for crop 1865. The oats in the above case being thick, and growing most luxuriantly, smothered the beans, and prevented them fully podding. A part of the field was sown with pease instead of beans, and that sort of maslin is probably the most profitable of the two. Wheat (dunged), and sown out with seeds, follows the drilled-maslin; the ground having been thoroughly grubbed, harrowed, and cleaned, during the dry weather in October, 1864.

The kind of beans grown in Ayrshire are the common tick or horse bean, of a medium size, not so large as those grown in the Carse districts, nor so small as the round foreign tick. One-half or more are raised as manured drill-beans, at a width usually of about 27 inches, and sown sometimes with the drill-barrow, and sometimes broadcast over the drills. Seed, generally about 4 bushels per Scots acre. The shire occupies a prominent position for beans, though looking to amount of cultivated land and nature of soil, one might naturally expect a greater acreage; but the wetness of climate in the latter part of the season when the plants are in flower, is against a profitable return in bulk and quality of seeds. The extent under beans in Cunningham in 1819 was 1555 imp. acres, from which we deduce the total acreage in Ayrshire at that time as fully 4000 acres, whils' in 1856–57 the total area reached only 3400, so that bean culture has fallen off. By the Fiars prices for 1864 beans in Ayrshire are now rating nearly 2s. per quarter higher than wheat, and we may reasonably look for a greater acreage soon. Wheat, seemingly, must be given up entirely. Pease as a separate crop are unknown in Ayrshire. The time of sowing preferred for beans (weather permitting) is early in March on the heavier soils, but usually later on the lighter, and as we near the sea.

Oats over the whole county occupy from one-half to two-thirds of the total acreage under tillage, and four times the acreage that is under wheat. The total land under oats in 1856–57 was 62,000 acres. The kind of oat almost universally grown throughout the inland parts, and very common, too, even in the shore districts, is locally called "Tam Finlay." It is a thin-skinned, long white oat, always furnished, when pure, with a very long bent awn, to which, with the frequent want of dry, hot sunny weather in August, is attributable the comparatively light weight per bushel; although the consecutive crops have also to do with the weight, as the grain of the second crop seldom fills well. When broadcast beans are taken out of lea, and succeeded by oats, that of course alters the case entirely; but when green-cropping is purposed, any little gain made from the second crop of oats (if thrown out), would be more than compensated for by the greater fertility of the land when again laid down to grass; but, again, with three-fifths of the land under hay (ryegrass-seed) and pasture, and one-fifth under wheat and roots, we need the other one-fifth (or two years) to be under oats, or possibly we may run short of fodder; and that is where the want of permanent meadow-land for cutting, in the lower parts of Ayrshire, is felt. An eight or nine years course, with no wheat, in these times, would surely be preferable—say, oats—green-crop and drilled-beans—oats—green-cut hay, with plenty of clover—and 4 or 5 years in pasture. The "Tam Finlay" oat is somehow peculiarly suitable to Ayrshire. The writer has often persuaded farmers of the best oat-growing inland districts to give a trial to some of the East country varieties, but after contrasting them fairly for two or three years, they aye steadfastly fell back on their fail-me-never friend Tam. Taking everything into account—straw, measure, meal, and adaptability of plant—we question if a better variety could be got for the great breadth of Ayrshire.

One chief advantage of the "Tam Finlay" is the superiority of its straw as cattle-fodder. It also bleeds well off the straw, eighty bushels per Scots acre being thought nothing uncommon in seasons of good crops from land in good heart, although from poor exhausted soils not more than a third of that is only too frequently obtained, and these some years back, numbers of clay-soil farmers have not doubled the seed sown. It also gives well in meal—that is, such a weight even as 32 lbs. quality yields what is termed *meal for corn*, or 140 lbs. oatmeal to every 8 bushels oats. The average weight per bushel of this variety for the county will be about 35 lbs. in ordinary seasons, but for crops 1861, 1862, and 1863, it would not average above 31 lbs., much of it in these years not having reached above 25 lbs. per bushel. What surplus oats are to dispose of, the farmers get ground on their own account, and sell in the form of meal,—receiving back from the miller the "husks" and "mill-dust" for boiling purposes. The Ayrshire millers are famous for making good oatmeal, which usually fetches 1s. to 2s. more per load in the Glasgow market than that from any other district.

Oats are always sown broadcast and from hand; the common variety at the rate of 5 to 6 bushels per Scots acre on the better class of soils, and from 6 to 7 bushels on the poorer uplands. Thick sowing is in general favour with Ayrshire farmers, as that tends to bring the crop sooner ready for reaping,—a most desirable thing with a west-country autumnal climate. Many farmers now incline to sow oats earlier, about the middle of March, if the weather fits; but a large breadth are still put in towards the end of March, or early in April. A more frequent change of seed, if only from the earlier and lighter-soiled districts on to the more backward clayish soils, and even *vice versa*, would be found most beneficial. By selecting seeds from vigorous plants, remarkable for size of panicle (bunchy and close-set with florets), especially if got combined with earliness of ripening, vast improvement on the "Tam Finlay oat" might be made. The principal wheat growers now import great part of their seed-wheat and seed-oats from East Lothian and England, and nothing tends so much as such renewal to having good crops or heavy plump grain, although a drawback to the sowing of Lothian oats is the prevalence of "wild-oats" in even the cleanest samples, and the "wild-oat" naturally is hardly ever found in Ayrshire; neither are "runches," (*R. raphanistrum*), and "wild mustard" (*sinapis arvensis*), so common as in the east. On some of the better class of farms placed on the lower slopes of Kyle and Cunningham, and generally on all the low-lying fertile soils of Carrick, early short oats are grown in more or less proportion; and as good crops of these, with fine samples of heavy grain, are raised, as even Kelso district would find it hard to match. "Early Angus" oats are cultivated by a few farmers amongst the uplands of the Cumnocks and other high-lying parishes, but even there the "Tam Finlay" variety is generally preferred.

Rye is grown to the extent of about 600 acres yearly. Fife, Elgin, Aberdeen, and Ayr, containing the half of the 3,500 acres under this cereal annually in Scotland. It is nearly all raised in Ayrshire on the purely sandy soils along the coast. The writer is old enough to remember extensive ranges of sand-hills and sandy bent-ground, of probably 2000 acres area or more in all, lying betwixt Saltcoats and Irvine, Irvine and Troon, Troon and Prestwick, at that time stocked with rabbits, regularly fed and protected, but great part of which is now levelled and reclaimed, and orderly cropped with rye, wheat, early potatoes, turnips, cabbage-seedlings, &c. To Mr. James Hutchinson, Gailes, and his late father, is due the credit of improving a large portion immediately south of Irvine; and the latest noticeable extent recovered was by Mr. Thomas Reid, Monktonmiln, north-west of Monkton village. Mr. Reid rents about 400 acres on the Fairfield estate, and about 16 years ago levelled fully 100 acres of the sand-hills, at a cost averaging £12, 10s, per acre; the then proprietor, W. Gunning Campbell, Esq., advancing the money, and upon which Mr. Reid pays interest during his lease, extended to 44 years as an inducement to level. The object in view was either to feu the levelled and improved sands as sea-bathing quarters, or to have them irrigated by town sewage water; and possibly ere long both ends may be obtained. Mr. Reid is bound to no particular rotation on his light sandy soil. He frequently takes 2 year's green crop (successively) from the lea, followed by a grain crop with seeds; and good pecuniary returns are obtained in potatoes, turnips, &c., from those warm sands, the moistness of climate being very favourable. Mr. Reid, like most other of our wheat growers, complains that his land has got tired of wheat, and has grown none of that cereal for several years. He now sows oats principally and rye. It was well that means were taken to extirpate the rabbits, as they had spread themselves several miles inland, and were not at all looked upon as welcome guests on their corn lands by the farmers. We see rye, too, sometimes growing upon patches of improved moss.

Bere and *barley* were cultivated in Cunningham division alone in 1819 to the extent of 1,380 statute acres; but in 1857 their cultivation over the whole of Ayrshire had shrunk in to a less amount than above by fully 200 acres. Throughout the inland districts now, neither bere nor barley is grown, save an odd *rigg* on farms here and there to furnish 4 or 5 bushels of grain for the "kale-pat." The cause of the declension is not from want of demand, as the Ayrshire brewers and Campbeltown distillers are open to purchase any quantity. Probably wet harvest-weather—very inimical to barley crops—is the chief reason of barley not being more sown in Ayrshire, at least on the lighter and sharper soils. However, barley is again being rather more grown of late, chiefly in St. Quivox parish, and along the Carrick shore. We give the management of this crop by Mr. James Wright, South Sanquhar (Forbes of Callander), St. Quivox, one of our most successful barley raisers. Mr. Wright manages his light land on the 5-shift course, grazing the 2 years under seeds, and the green crop entirely early potatoes, with barley sown out generally following. As in many other cases, wheat has not succeeded well with him for a number of years back. The heavier portion of the farm is worked on a 4-shift—oats, green crop, wheat, hay. The potatoes are manured with from 50 to 60 yards of farm-yard dung, and 4 to 5 cwt. per. guano, per Scotch acre. Mr. Wright prefers to manure rather heavily with the potato crop, and give no further dressing to the barley; his reason being that the manure is thus taken with the soil, and throws firmer straw (not so apt to lodge), as well as healthier grain better adapted for the maltsters. The kind of barley sown is "Chevalier" from Edinburgh:—Seed per Scotch acre, near to 4 bushels; time of sowing, end of March or first week in April; average produce, from 6 to 7 quarters; average weight, 57 lbs. per bushel. The crop is reaped in August; set up in six sheaves to the stook without hoods; put into good sized rickles about six days after cutting, or sooner if rain is feared; stands other six days or so in the rickles, and afterwards stacked for a few weeks ere thrashing. The straw is mostly used for bedding the cattle, but they eat it freely for a short time when newly thrashed. Price of straw usually 1d per stone lower than oat straw. Ayrshire fiars prices of grain 1864:—Barley, 26s. 7½d. per qr.; wheat, 34s. 8d. per qr.; oats, 14s. 10¾d. per qr.

Ayrshire in whole cannot be put forward as a wheat-growing region; although, for all that, we rank as the fifth wheat-growing county of Scotland. The acreage annually is about 16,000. Compared with the counties of Fife and Haddington on the east coast, the acreage of wheat grown here, in proportion to the total acreage under tillage, is 6,000 acres short as to Fife, and 10,000 acres short as to East Lothian; but considering that most of the wheat in Ayrshire is raised on a stripe of land along the coast, and that no barley to speak of is grown here, whilst these other counties comprise nearly as much land under barley as under wheat, it is evident that our *shore farmers* must cultivate wheat in by much the larger proportion of the three. With relation to the land under tillage, Ayrshire grows a rather greater proportional extent of wheat than Berwickshire, and a rather less than Perthshire, but both of these counties grow barley extensively. Lanarkshire is greatly more deficient in wheat than Ayrshire, and Wigtownshire grows about equal proportional extent. Wheat in our inland straths is almost all autumn-sown; the land being ploughed with a good deep furrow when in suitable condition, from beginning of October to end of November, and sowing immediately after at the rate of about 3 bushels per acre. More seaward the potato land is generally sown from middle till end of November, and the turnip land afterwards, as soon as it can be got cleared, and as weather permits. February being preferred generally for spring sowing. Spring seeding from 3 to 4 bushel per imperial acre. Wheat is almost without exception sown broad-cast and from hand. We see cases occasionally of it being *ploughed-in* on the light holming land. The kind mostly grown is "Hunter's white," although "woolly-eared" or "rough-chaffed white" (*alias* "hoary-ear," *alias* "velvet-ear") is also much run upon in some districts, as it yields better per acre, and the grain is preferred by bakers. Most of the other white varieties are raised in more or less proportion, but no *red* wheats are grown, except sometimes a little "bearded April" for late sowing. Ayrshire or home grown seed (usually only one year grown from English or East Lothian) is generally pickled before sowing; the most common steep being simply brine (salt and water), and afterwards dried with finely powdered lime. English or East Lothian seed is always sown *clear*. It is a sign of a good by-gone season, when wheat averages 60 lbs. per bushel over the county. We would not feel justified in giving the average produce for the county during the last 6 or 7 years at more than 20 bushels per imperial acre. It has been no joking matter with arable land farmers, these some years back, *trying* to raise a turnip crop, and that coupled with the subsequent poor crop of wheat, as well as the deplorable sum which even that poor crop now realizes.

The house-feeding given by the dairy farmers, generally, to calving or early-calved cows, consists of chaff and barn-gatherings with a few turnips boiled together. The sap is partly dried up by mixing "rough seeds" and "mill-dust" with the "boiling" in the cooler, and to this is added an allowance of bean-meal, or maize-meal, or ground oats, or all three mixed, for each cow that gets. But since the introduction of *mangold-wurzel*, it has greatly superseded the turnips for boiling, and from its superior nutritiousness, less beanmeal or other auxiliars are required. The mangold retains its feeding qualities till spring-time much better than turnip, and produces richer milk without the peculiar taste which turnips give. Turnips certainly throw a large quantity of milk, but of a watery quality, with little cream off it. In 1856-57, the acreage under mangold in Ayrshire was fully one-third of all grown in Scotland—viz, 1100 acres; but for several years back the acreage under it has been lessening on the larger-sized farms, from want of sufficient heat and sunshine to develop the roots. Mangolds can hardly be expected *in Scotland* to average one year with another as great a weight per acre as Swedes. Swedes of late years, however, have dedecayed much during winter, and to the vast majority of the dairy farmers, growing only a few acres of roots in all, the mangold crop is most desirable. By cultivating on the warmest and freest patches of soil they have, and manuring heavily with well-rotted dung and guano, mangolds, over wet seasons and dry, may always be raised to be more profitable to them than Swedes. Even the leaves of the "shot" plants are first-rate feeding, and very productive of milk; and the sound roots may also be *leaved* without injuring the growth of bulb Any further comments on mangold-culture are unnecessary, after the prize essay by Mr. Robert J. Thomson, lately published in the Transactions.

The *cabbage* portion of the green-crop break is used as feeding to the milch cows towards the end of the season, when the pastures are bared and the cows beginning to dry up. The "large drumhead" variety is almost the only kind used for field planting. Cabbage was introduced into Ayrshire, *generally*, as a field crop, between 1830 and 1840, and in 1857 had increased to 483 acres, being nearly one-third of the whole in Scotland. Previous to 1830 neither cabbage nor mangolds were at all common; but they are now grown more or less by nearly every dairy farmer—from 20 poles or so up to one acre or more of each, according to number of cows. Few kinds of food, if any, are better than cabbage for filling the udder with good untasted milk, and cows are remarkably fond of them. But they must be treated to a large dose of well-made muck to yield a profitable return in big weighty bolled heads; and thus treated they will produce more weight of nutritious food off a given space than either turnips or mangold. Cabbage might be advantageously grown in Ayrshire to a still greater extent. It is upon moist clayish loams that they succeed best, and such a fine tilth as for turnips is not necessary, —indeed, the crop is usually heaviest with the land at planting-time rather cloddy, always granting that the muck is around their roots in due *quantum suff.* One of the best growers of cabbage in Ayrshire is Mr. Hugh Woodburn, Annandale, Crosshouse, Kilmaurs. The soil of Annandale is mostly a deep, rich, clayey loam. Mr. Woodburn grows about two acres annually. Gives one deep furrow in autumn, and has the plot again harrowed, grubbed, and drilled up in spring, much the same as for his turnip crop, but not caring to reduce the soil so fine. Width of drills, 31 inches. Manured at the rate of 60 to 70 cubic yards of farm-yard dung (part sometimes ploughed-in in autumn), per

Scots acre, and 2 cwt. peruvian guano sown broadcast on top of same. Drills reversed enclosing the manures, and then rolled flat to break the clods and let the roots of the young plants well into the sappy dung. Plants with "drumheads" at 3 feet distances, zigzag in alternate rows, so as to have about three feet of clear space around each plant; and the blanks arising from deaths are afterwards filled up with the "early Enfield-market" sort. After being grubbed and cleaned, and before finally earthing-up, fully 1 cwt. per acre more of guano is sown between the drills. All the best growers of cabbage consider a dressing of artificials, or "addling" by some, during summer, most requisite. Mr. Woodburn dibbles the plants, but we notice them sometimes slitted-in with the spade, as they are presumed to catch root sooner so in dry weather. The dairy cows at Annandale are very highly fed with beanmeal, brewer's grains, rape-cake, bashed-oats, &c., and the farm-yard manure is therefore richer than common; and although the above manuring may be thought excessive, yet Mr. Woodburn, by giving the cabbage plenty of room to grow in, never misses a good crop, generally upwards of 40 tons per acre, and of course it tells also upon the succeeding wheat. Annandale's whole farm-management, and the skilful and careful superintendence of Mrs. Woodburn in the dairy department, are both most excellent of their kind Mr. Guthrie, of Crossburn, is also a very successful grower of cabbage, having usually about 5 acres for the milch cows he sets "abowing." Grange, who marches with Annandale, manures for cabbage at the rate of nearly 30 cubic yards dung, and 8 cwt. Peruvian guano, per imp. acre.

The time of planting, &c., varies on different farms, according to season and system. The cabbage-seedlings for transplanting are grown broadcast on the warm sands, chiefly around Prestwick and Monkton. The seeds are sown on the fresh turned-up land as soon as the early potatoes are lifted, standing through the winter, and followed generally by a cereal crop. Prices of plants alter as the crop may be good or bad, from 2s. 6d. to 6s. or 8s. per 1000; and, of course, when prices rule high, a large saving in plants is effected, by heavy manuring and wide planting.

Kohl-rabi has been very little grown in Ayrshire. The only places the writer ever saw any noticeable acreage of it, was on Craigie Home-farm, by the late James Campbell, Esq., and by Mr. A. B. Telfer, whilst in Cunning Park, both near Ayr. This plant is highly thought of by dairy farmers in various parts of the continent, and its cultivation being every way similar to that of the Drumhead cabbage, only that it may be much closer planted in the drills, it might be usefully introduced on the stiffer soils of this county. It probably would not yield so great a weight per acre as the cabbage, but it is far better fitted for storing and keeping—superior in that respect to turnip or even mangold. Like cabbage, and unlike turnip, it does not give any nasty flavour to the milk.

Ayrshire and Wigtonshire are the only Scotch counties which grow *carrots* to an extent worth mentioning. Their average, about 400 acres each, being fully the half of all in Scotland Drilled turnips, cabbage, and carrots, were grown experimentally as field crops at Loudon, so early as 1760; but the reporter's father was probably the first to begin the field-culture of these in much quantity, between 1800 and 1805, at Assloss, near Kilmarnock, and at Holmes, near Galston; he having come west from Angusshire a year or two previously. The high acreage now under carrots, however, is not much imputable to the dairy cattle, although most dairy farms grow more or less, from one or two drills up to half an acre or so. They are grown more extensively by some of the light-land shore-farmers to supply the demand for them as horse food from Liverpool, Glasgow, and other large towns of the west. From the large trade in iron materials, far more horses proportionally are kept on the west coast, than in such towns as Dundee, Aberdeen, &c., on the east. A good home demand also exists in Ayrshire, and the juice of the red sorts is used by many of the dairy-wives as colouring matter. Large crops of *white Belgian* are raised on the improved black soils with little manure save a sprinkling of artificials; and the crop generally in Ayrshire is a paying one, although loss is frequently sustained in the red sorts, when these are attacked by worms. The white variety is much the easiest and safest to grow. Details of carrot culture are needless here, as these can be fully obtained from the prize essay by an Ayrshire farmer, not long since published in the Transactions. Some of the most constant and largest raisers of carrots are in St. Quivox parish, north-east of the county town, as Mr. Robert Wallace, Kirklandholm, and Mr. Templeton, Sandyford. The former gentleman, also, excepting the Messrs. Imrie of Ayr, and the writer himself, being the only one we know of, who has for long and regularly raised turnip-seeds, taking that crop after early potatoes instead of wheat.

A drill or so of *parsnips* may be seen occasionally, but that is about the most. This vegetable is more nutritious and of easier cultivation than carrot, besides having a greater adaptability to different kinds of soils Either for throwing *rich* milk, or fattening quickly, it is probably superior to any other of the cultivated roots; and to the *small holders* of Ayrshire, with perhaps not more than an acre of green crop in all, parsnips are undoubtedly deserving of more regard.

Little, if any, *Rape* is grown in Ayrshire, excepting now and again by a few farmers after early potatoes, and sometimes eaten off with sheep, and sometimes ploughed in young as green manuring for the wheat crop. *Vetches* are grown for green house-feeding on almost every farm, but seldom more than about a rood in extent, and most frequently not so much. They are always sown in mixture with beans, or oats, or both.

Thirty years ago, and previously, *flax* was grown in small degree upon almost every farm, generally for home use, except in the parishes of Dalry, Beith, and Kilbirnie, where it was cultivated to a greater extent for sale. But its culture began to dwindle about the time stated (probably from the introduction of cheaper cotton goods), and was quite given up a few years later, saving only in the parishes named. There were 318 statute acres under flax in 1819, in Cunningham division alone, from which it is inferred that the total acreage in Ayrshire at that date would be from 500 to 600 acres; Kyle and Carrick never having grown this plant so extensively as Cunningham. The reporter observes that the Agricultural Statistics of 1856-57 give the extent of flax grown in Ayrshire for these years, as respectively 10 and 17 acres only, but some error must surely have crept in, as he is pretty confident that the quantity in the above-noted district never fell below from 100 to 200 acres. The acreage under flax in 1863, in the three parishes of Beith, Dalry, and Kilbirnie, was from 310 to 320 imp. acres; although, probably, not so much as other ten acres were grown in all the rest of Ayrshire. In 1853, the late and much-mourned Lord Eglinton exerted himself to induce his numerous tenantry to grow flax, but the effort was not successful, as few continued it more than the one season, owing probably to the rise in prices of grain during the Crimean war. High prices of grain, most unquestionably, cannot jar with flax cultivation now.

Flax certainly merits more attention at the hands of Ayrshire farmers. The crops of it around Beith are generally good, and worth any two average oat crops. There is plenty of outlet for it, as the Messrs. W. and J. Knox of Kilbirnie, and the Messrs Crawford Brothers, of Beith, are open to purchase far more than they can get the surrounding farmers to grow. Presently the crop, as grown in Ayrshire, has not justice done to it. It is only the poorest land which the Messrs. Knox can generally get to lease from the farmers, although paying a rent per acre that could not be realized in ordinary seasons from a good oat crop; and besides, the Messrs. Knox are at all the expense of seed and hand labour (the farmers doing only the ploughing, harrowing, and carting), yet with all these drawbacks the Messrs. Knox find that the crop pays. The flax crop is not an exhausting one as many farmers ignorantly suppose. It is only exhausting so far in relation to its effect upon future crops of flax. Coming in once in 9 years or so, the soil has more than time to recover fully for another crop. When *seeds* are sown with the flax crop, the ensuing hay is always unusually heavy, more so probably than after any other crop that the land can be sown down with. The following rotation would be a most profitable one out of much of the old lea-land (6 years or fully) in Ayrshire, say, (1) break up with broadcast beans, (2) oats, (3) flax with seeds,—but no ryegrass seeding, mind.

Presently, with wheat scarcely saleable at 35s. per qr., and just very middling crops of it, flax after green crop, with seeds, would pay much better. It is not only the fibre, but the seed of the flax is got also for feeding purposes, and every farmer knows or ought to know how exceedingly valuable lintseed is for fattening. Curious, is it not, that our flax manufacturers and feeding stuff merchants are obliged to import most part of their supplies from Russia, &c., whilst these might be most remuneratively grown at home, and the money thus put into our own farmers' pockets, just where it is greatly needed? Surely Scotchmen are as able to grow and manage flax and flax seed, as are the Russians, or Poles, or Irishmen even; and these can do it to good pecuniary account. Excepting undrained clays, all the soils in Ayrshire, from the upland moorish on the east, through the meliorated clays and loams, to the improved sands along the shore, are suitable for flax culture, and where properly drained, the constant moistness of climate is most favourable. Tolerably fertile-clayish loams, with clayish subsoil, raise the best flax crops; and that description of soil abounds most by much in Ayrshire. It is not ignorance of flax culture which prevents ourfarmers going into it, but we rather suspect that the trouble connected with the *steeping process* is the main hindrance.

With the lengthened grass rotations in the more inland districts of Ayrshire, and the limited areas under cleaning crops, bare or *summer fallowing* is seldom thought of. Towards the coast, and with shorter and more regular rotations, it is now, we may say, even on the heaviest lands, almost if not quite disused. The holders of clay soils, who still attempt to carry on turnip growing upon these to much extent, are often compelled to leave a portion of the break fallow or unsowed, simply because they cannot get on it to work it, but if summer fallowing includes the aerification and cleaning of the soil, then, generally and in the majority of cases, these portions though "fallow" in one sense, cannot be called "summer fallow." A neighbour of the writer's, Mr. Matthew M'Queston, Blair, Hurlford, very successfully fallowed a ten-acre field this summer (1864), but he could not have got the same chance during the seven or eight previous years, and it may be probably as long again ere such another suitable season comes round.

The high "crooked" ridges of former days are now nearly all levelled down and straightened, mostly prior to 25 years ago, though much of this kind of work has been executed within that period; and even still, fields laid off into these high and wide "bowed-riggs" may be seen here and there. The ridges now are of 15 and 18 feet widths, and slightly rounded. Wide level breadths with few open furrows will not do in Ayrshire. Lea land is commonly ploughed with a furrow of from 5 to 6 inches depth, and the stubble ground for the second crop, and "faughing" for green crop, always from an inch or two to three inches more (in the latter case generally with three horses abreast). The productiveness of the consecutive crops of oats is due entirely to the greater depth of furrow, and the grass roots and foggage being by that time thoroughly converted into plant food. Ploughing has probably been brought nearer perfection in Ayrshire than in any other part of Scotland, and consequently of the kingdom. During the month of February, indeed, when the ploughing of the lea land is mostly proceeded with, most of the farmers and all the ploughmen get half (aye three-fourths) crazy on the subject. Every parish has its annual ploughing match, and some of them several. Annual ploughing matches were entered into with Renfrewshire a few years back, each county picking out and sending ironed for the contest ten of their respective best men, but Ayrshire proved too heavy metal for her "wee brither of the wast countrie," and so Renfrew withdrew.

Till within the last 15 to 20 years, the "sickle" was in general use for cutting down the crops, but about that time the "scythe" came into vogue, and is now, except by those who employ a "reaper," by far the most common. On many of the small Ayrshire fields of from 5 to 8 acres, in the inland districts, indeed, even in comparison with the "reaper," the scythe is yet the best implement for speed, cheapness, and making a good job. More fodder is always got by using the scythe, especially with rounded ridges, which as stated are still common on strong lands. Beans are always reaped with the sickle, and sheaves of drawn oat-straw for bands are carried along by the shearers. Reaping-machines were pretty general on all the larger farms at harvest of 1861; harvest of 1862 they were still more common; and since, almost every farm of 100 acres and upwards, has, at least one of these whirring cheerily along. Excepting some half-dozen or so, the "reapers" are all made in the county; being two-horse manual-delivery tilting-machines, cutting from 5 feet to 5 feet 6 inches, and at a cost generally of about 6s. per imperial acre, including wages, extra corn for horses, oil, and breakages. The evenly and regular cutting and laying-in-sheaf by these "reapers," especially in Ayrshire, where the stuff often stands out for weeks in stook, is even a greater benefit than the low cost; although with extra heavy crops, it is sometimes difficult to tilt the sheaves small enough.

Oats are generally "stooked" in sixes, and wheat in eights and tens, without hoods. The stacks in the barn-yard are all built circular, excepting beans, which are sometimes put together in an oblong form; and the farmers in general have a commendable pride in stacking *neatly*, more so than in other counties. The stacks of oats vary in size from 6 to 15 qrs., and of wheat from 10 to 15 qrs., but in occasional harvests they have to be put much smaller to prevent heating. *Coir rope* for securing the thatch is now used by a good many, being thought firmer, cheaper, and more expeditious, than straw. "Hutting" in the fields in Ayrshire has frequently to be resorted to in wet harvests, and these form the rule, not the exception; and from the same cause, "fause-houses" in stacks on farms where stathels are not in use are often had recourse to, in order to admit air into the "boss." The torrents of rain that so frequently fall during harvest is one of the greatest plagues to which Ayrshire farmers are subject. It requires the most constant vigilance and greatest exertions in most seasons, both by night and by day, to get the stuff stacked in good condition. As an instance of Ayrshire climate, in the autumn of 1863, the Dunbar farmers were busy "inning," when their brethren on the west coast were just beginning to cut; and during the early part of November in same season, several farms not far from Kilmarnock had a good part of the crop out. Even this season (1864), an extra good one, cutting was not general over Ayrshire till about the middle of September; although in Perthshire much grain was safe under "thack and rape" by the latter end of August. The harvest of 1862, in particular, was very bad; being probably the most tedious and latest which has occurred since 1782.

A complete set of Fowler's apparatus was brought into the county in 1862, at the joint expense of the Ayrshire Agricultural Association and Mr. Alex. Weir, Chemical Works, Newton-upon-Ayr; but the result of its labours, financially at least, has been a failure. Ayrshire farms, generally, are too small in size, the fields also too small and irregularly shaped, and the surface of too rolling a nature, to suit steam-ploughing. Rather, perhaps, is the steam-plough not suited in its present form to Ayrshire farms, and still more unsuited to the pockets of Ayrshire farmers. Ploughing goes on by fits and starts, from October to March, and even were some half-dozen farmers to club together for a "steam-ploughing apparatus," that member of the partnership whose turn came last, would generally find himself busy ploughing when other folks were hard at sowing. No soil in Scotland, considering the climate, could be more benefited by steam-ploughing than that of Ayrshire. Mr. Weir's apparatus, we believe, has done nothing since its first season.

There are at present four portable steam-thrashing-mills travelling the county, although every farm, save the extremely small holdings, possesses a fixed thrashing-machine, commonly wrought by horse-power, in some cases driven by water, and in a very few comparatively by steam.

SECTION IV

General State of the Grass Lands—Ryegrass-seed Preserving—Hill or Bog Meadow-Land, and sown-down "Irrigation Meadows"—Artificial Grasses—Drainage—Liming, &c.

"Blessed is he who causeth two blades of grass to grow where only one grew before." One may be able to form a better notion of the state of the grass-lands, by first getting an account of the pernicious and unthrifty practice of seeding the ryegrass hay-crop, very generally followed in all the inland districts. This practice continues firm and constant, and, if anything, is on the increase. The amount of seed annually saved has more than doubled within the last 25 years. Ayrshire now, certainly, is not alone in the practice, but it originated here, and this county always has been its headquarters. Ayrshire of all other districts in Scotland should be the last to foster the pernicious custom. Tillage operations, or raising of roots, corn, and *seeds*, on purely dairy farms, ought always to be merely subservient, and subordinate to the grass-feeding of the milch cows. How to improve his grass-fields, especially in these years of high prices for cheese, butter, and young cattle, ought to press most heavily on the dairy farmer's mind, but so far from this being the case, the cultivation of good pasture is without doubt the most neglected branch of farming over all the West of Scotland. The reporter purposes, therefore, to take a brief survey of the evil effects attendant on the practice of ryegrass-seedsaving, which may be styled the "peculiar institution" of Ayrshire. With respect to it, to gratify avarice or need, good husbandry and ultimate gain are sacrificed.

The produce of seed per imperial acre over Ayrshire ranges from 12 to 30 bushels, and in exceptional cases even more, but 22 bushels may be set down as a full average;, and in placing the average price to farmers at 3s. per bushel for the last 20 years, full justice is done to the credit side of seed. The "broke" and "cleanings" are worth about 5s. per acre for boiling uses, although, properly speaking, the farmer would have got the benefit of these even had the grass been green-cut. There is no other advantage of any sort gained by the seeding, so that the total amount in favour of seed is £3, 11s.

On the debtor side there comes first, the extra amount of working expenses. The "bunching" and "tying," "stooking," "hand-hutting," thrashing and shaking, preparing the seed and carting it to stores, will cost at the least 10s. per acre, and against that we have to put only 2s. 6d., say 3s., per acre, for making the hay when green-cut; the mowing, raking, carting from the field, and stacking, being the same either way. Debit seed therefore with 7s.

The second item of loss is, the deficient weight per acre of the thrashed ryegrass hay. An average crop realising 22 bushels of seed will not weigh more than about 125 stones (24 lbs.), or about 27 cwt. Most of the seed-raisers have a custom of sowing an acre or so next the gate for early green-cutting to the horses, and on this part they will sow at the rate of 6 to 8 lbs. of clovers, whilst the rest of the field does not get more than from 2 to 3 lbs. per acre, mostly *white*. In many cases, indeed, the large breadth of the field is sown entirely ryegrass, not even a smell of clover seeds. These clovery bits next the gate would yield twice the weight of very superior hay if so made, compared with the remainder of the field, but good clovery hay and ryegrass-seed cannot be got together, and, so long as ryegrass-seed is the chief end of the farmer, he must make up his mind to have poor hay and very little of it,—handfuls of fusionless, harsh, wiry stalks! We debit seed, therefore, with 50 stones deficiency of green-cut hay—that is, less than what might easily be got were it not for the seed-saving, say 35s. In point of fact the loss is much more, as the aftermath or second cut (even were it taken, which it is not), is simply worth nothing, or next to it; but even allowing the aftermath to be grazed, about four weeks good grazing is still lost from the "seed-hutts" occupying the field. A month's grazing on the rich aftergrass of a green-cut properly-sown-down hay-field, aids the other pastures to stand out, and keeps the cows well up in their milk.

As can easily be inferred from the last paragraph, the quality of the thrashed hay is very inferior. It usually rates in the market from 15s. to 20s. less per 100 stones than good green-cut mixed hay. Debit seed again, therefore, with 22s. per acre, on account of the defective quality of that amount of hay got.

The next item of loss is, the deterioration of the soil. It must be borne in mind that nearly all the ryegrass-seed saved in Ayrshire (about 3500 tons annually) is sold forth the county, and none of it is again returned to the soil in the shape of manure. The ryegrass roots left in the soil, also, are worth little or nothing as manure, and further, the manurial ingredients of any value required from the soil to build up the straw, are very small in amount opposed to those carried off by the seeds. The loss per acre from this cause must only be a guess, but the value of a quarter of oats is probably much too little. Would a hay-stubble field which had been seeded yield as good a crop of oats by 8 bushels, as otherwise it would had it been early green-cut? Why do so many of the seed-raisers top-dress their seeded-hay-stubbles at the rate of 15 to 20 carts per acre of towns dung, but none of them ever think of top-dressing any portion that may have been green-cut? We further debit seed with 16s. for deterioration of soil.

It has now been pretty conclusively shewn, that the farmer, instead of being a gainer, suffers an actual loss of 9s. per acre, by sowing nearly rye-grass only, and seeding the hay; and the calculations are rather partial to the seed-raiser if anything. But by far the most serious resulting-evil of this practice to the dairy farmer is yet to come, and that is, the miserable state of the pasture during the first and second years, and in a less degree for so long indeed as it rests.

From a continuity of culture and yearly seeding almost since their introduction, rye-grass seeds have more than doubled themselves in weight per bushel, and as a natural consequence of so long a course of cultivation for its seeds, the plant in Ayrshire has been brought into a state, in its duration and manner of growth, nearly identical with that of the cereals, though, of course, very inferior yet economically. It produces now almost no root-leaves, only stalks and seeds, and even though grazed the first year or green cut for hay, a large proportion of the roots die out ere the end of two years from the time of sowing, whilst when seeded the first year as in Ayrshire, at least nine-tenths of the roots die out very shortly after the seed hay crop is cut. When Mr. Fairlie bound the Eglinton tenants, about 1780, to sow out with 3 bushels ryegrass and 12 lbs. clover per acre, the grass seed would not weigh probably above 12 lbs. per bushel, and quite a different pasture plant then, in perennity, &c., to what it is now—much the same in fact to meadow fescue at the present time; and we venture to say, that Mr. F. had no idea of, and did not allow, the tenants seeding more of their hay than required for self-use:—

By the present "Rules and regulations to be observed by the tenants on the Duke of Portland's estate," they are bound to a 10-year rotation on their *clay* lands (including 6 years under grass, but with liberty to cut the grass of the first of said six years for "*green* food or hay," if so inclined); and are also bound to "use not less than one firlot of good perennial rye-grass, and 12 lbs. weight of good white clover, for each acre, and such other seeds as may be necessary, for sowing out with under the said 10-year rotation." The above rotation, as already mentioned, is pretty common on all the clay soils belonging to His Grace, although it is not strictly enforced, but the stipulation for the 12 lbs. of white clover per acre, is mere waste paper, as it is in no case acted up to; in fact, excepting a very few of the

> tenants, chiefly on the "Fullarton estate," the average weight of white clover (or, of clovers, *in toto*) sown by the Duke's tenants, will hardly reach 2 lbs per acre. Were they compelled to sow the full quantity agreed upon, the subsequent pasture would certainly be very superior, whether the rye-grass hay was seeded or not, although it is distinctly stated that the grass is to be cut "*green* for hay"

The late Mr. Campbell of Craigie prohibited his tenants from saving more rye-grass seed than actually necessary for their own sowing, and other Ayrshire landlords would do well to follow the example, if only for their tenants' own good.

Hardly any thing in most cases being now sown but rye-grass, the exhaustion of the soil by the seed crop more than counterbalances any benefit arising from the few artificial roots left. What few sickly roots of ryegrass are to the fore, come away in the forepart of summer like so many darning-needles, and there is little herbage of any other kind save weeds, with in most cases about one-half the surface in a state of nudity After green crop the land is even barer of course than where sown down with the second crop of oats from the lea. By the third year the pastures begin to improve slightly, from the spreading of any chance white clover plants there may be, and from dropt seeds off what of the needle-like rye-grass stalks the cows had refused to eat, as well as from a few other grasses beginning to appear here and there; but the *creeping crowfoots*, and that "wee, modest, crimson-tipped flower," though worthless pasture plant, the common *gowan*, have multiplied and spread themselves still more, and in very many fields during the third and fourth years, about three-fourths of the surface is quite occupied by these two most nourishing (!) plants, neither of which is relished or eaten by cows unless incidentally or when forced to do so by hunger. Other two weeds, *Prunella vulgaris* and *Bartsia odentites*, are very common, and the prevalence of either in any considerable quantity is a sure sign, of an exhausted soil.

This destructive practice of ryegrass-seeding is one of the chief obstacles to improvement of the grass lands in Ayrshire. The proper test of agricultural progress over the great breadth of Ayrshire is, not how many more bushels of wheat or how many more tons of turnips are raised, but how many more stones of cheese are produced from each acre of land under grass. The reporter does not fear contradiction when he affirms that, there is less weight of cheese made now to the acre, over the county, than there was about 25 to 30 years back. The production of a greater weight of cheese per acre of grass, depends primarily on an improvement in the quality and quantity of the grass itself, not so much on the kind and milking-qualities of the cows kept, which, though important matters enough, are yet only secondary to the grass feeding. Probably a majority of the cows now possess better natural milking power than was the case 25 years since, and from the vast increase in the grinding of Indian corn, beans, &c., it is evident that house feeding is now being supplied more liberally than formerly—although, with some exceptional cases, scant enough still; yet these facts only prove, that, if with, at least, equal extent of grass land to the cow, and no proportional increase of milk over the season from the extra house food, &c., is perceptible, but rather the reverse, the pastures must be greatly deteriorated in feeding power. It is not to be expected that the cold-clayish pastures of most parts of Ayrshire, are to be as good as those of Forfarshire for instance, or even of the conterminous shires of Wigtown and Kirkcudbright, but at all events they might be generally a great deal better than they really are. Give up saving rye-grass seed for sale and exportation, and sow down the lands in a fair state of fertility with a good selection of fresh grass seeds and perennial clovers, and some thousands more of milch cows might be kept on the same extent of rotation grass, as well as the average yield from all the cows considerably increased.

The old rage for taking as many white crops as the land will possibly yield without entailing actual loss, still holds strong sway over the minds of many in Ayrshire. When restricted to two corn crops on their outfield lands, it was just this rage which caused them by-and-bye to begin seeding the hay crop, and taking even a second crop of seed from the second year's grass sometimes to the utter ruination of the pasture[*] The seed raisers do not appear to care how barren the soil may be when laid down in grass, seemingly expecting that grass (such as it is) can grow well enough without the requisite food being present in the soil. Absurd nonsense. To raise good grass the land must be in as high a state of fertility as for good crops of oats or wheat; indeed, good condition is even more needful for the former, as the best pasture grasses will not grow at all except on fertile soils. The particular degree of strength of the soil is of less consequence provided it be in sufficiently "good heart." All grass lands in course of time become intermixed with weeds and mosses more or less; but from the system of sowing only ryegrass, and that too the most *annual* kind of it (the *heaviest* seed), the bare spots of soil in the first year after the hay, offer every convenience for the seeds of weeds and mosses to take root and flourish upon. By having the land covered thickly from the very first with good grass and clover roots, mosses and weeds may be greatly and for long avoided, but to maintain in vigorous growth such abundance of grass and clover plants, the land must be in the most fertile condition. Any one can see that all that is directly contrary to the ryegrass-seed-saving practice. Now referring our seed raising friends to Prov. viii. 33, we dismiss the subject.

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[*] The ryegrass seeds sold as "second crop" are in reality inferior in perennity, and as pasture plants, to the seed of the first year, as in all cases where "second crop seed" is taken, the first year's grass has been seeded previously. Second year's seed would be superior, of course, if the first year's grass was grazed or early green cut.

Debarring this practice of ryegrass-seeding, the general cropping management of the inland dairy farmers is probably as good as the nature of soil and climate will admit of. Haply though perfectly correct in theory, yet green cropping in the majority of seasons and on most Ayrshire soils is found quite impracticable, and oftener more injurious than otherwise. Let the clay soil farmer work a field or two of his lightest land,—and few of them but have that much of comparatively light soil,—under a four or five shift course, so as to secure the limited but needful supply of mangold, cabbage, turnip, &c., and sow down the rest of the farm to lie always six years or more as circumstances may determine, breaking up with not more than two crops, or oats followed by flax perhaps, and by no means seeding the first year's grass. And 3 to 4 cwt. per acre of bone meal or super-phosphate applied with the second white crop would be of vast benefit to the ensuing pasture. All afterwards required is to top-dress the sward well with good home-made compost. If all the ditch scourings, waste banks, high "head-riggs," and scrapings of every sort of rubbish be collected, and mixed with due proportion of dung and lime, the compost will be found the cheapest and most efficacious manure in the long run,—not only fertilising, but adding to the depth of soil. Circumstances will determine, but during the months of March or April, just before the grass comes away, is the best time to spread the compost. There are hundreds of acres of cold wet clays in Ayrshire which no amount of drainage will ever much improve, and the above compost system is decidedly the best for these to better the herbage. Hand-weeding of thistles, docks, or other weeds, from out the tillage crops, and cutting the same down in the pasture fields, every farmer knows must be attended to; but in the latter case, unless the thistles, docks, &c., be cut down ere the plants come into blossom, the work may as well be omitted.

On most of the higher undrained clayish lands there is literally nought else growing save small blue sedges (popularly "blue one-pointed grass), common rushes, jointed rushes or "sprets," more or less of marsh bent grass, tufted hair grass, and a few other aquatic weeds. It is needless to attempt growing good grass or good crops of any thing on these lands till such time as they are properly drained. But the small blue sedge is common also in many drained pastures of clay soil, and when to such extent as is only too frequently seen, they are a standing proof to the farmer that his land is still so overcharged with moisture as to be incapable of high and remunerative cultivation. The drained clay lands on which these sedges are generally seen growing, are those done about 20 years ago and previously, at a depth of from 22 to 24 inches, and 15 or 18 feet apart. Sooner or later the whole of that shallow drained land will have to be gone over again. The tiles in some parts of these shallow drained fields are now only 12 to 15 inches under the surface, and do an actual injury to the top-ground, by filtrating off much of the finer material of the soil, and part of the strength of the manure in solution. Very probably, however, if the Alsyke clover was sown to any extent on these shallow drained sedgy fields, it would flourish to perfection even on the wettest of them.

The late Duke of Portland was the first to erect tile works in Ayrshire during 1825, and in August 1826, in a 15 acre field on the farm of Struthers, near Kilmarnock, tenanted by the reporter's father, the first drains were cut on His Grace's estates. We suspect this to have been the first instance of parallel tile-draining in Scotland, although parallel draining with broken stones and "engine-danders" had been done in some cases prior to above date, as at Daldorch in Sorn parish, and which latter are yet in efficient operation. It seems to the writer that a great deal too much credit for inventing or devising the parallel system of drainage is given to the "immortal Smith of Deanston," as Mr. Sanderson styles him. The old duke (as good a landlord as ever Ayrshire had—would that his successor would come down occasionally like his father and see for himself) had some thousands of acres drained, and the whole farm of Struthers for one, on the regular parallel system with tiles, long ere Smith's name was heard of. A portion of the above-noted field at Struthers was redrained in winter 1861–62, and every tile (12 inches long × 4 in diameter) when lifted, was found as fresh and good, and fit for service, as when first put in; and the increased crops from this portion since have well repaid the outlay. Draining was carried on briskly on the Portland estates at a depth of about 2 feet and 18 feet apart up to near 1850, when the depth was increased to 27 inches, then to 33, then to 36, and finally to 42 inches, at which, except in special cases, it has since remained. From 1826 up to 1846, his Grace had tile-drained nearly 12,000 acres on his Ayrshire estates, before many of our other proprietors had made more than a beginning. All the land on the Portland estates needing is now drained; and, of course, much the greater proportion on the shallow system. Most of the work done within the last six or seven years has been redraining or deepening the old drains to 42 inches, although 3 feet is found sufficient in some cases, and where the sub-soil is open it is done only with each alternate drain, but with stiff tilly bottoms every drain is deepened. The late Duke's charge for the original draining was 5s. per Scotch acre of additional rent, and in some cases on his poorer upland clays only 2s. 6d.; the tenants only carting and laying down the tiles in small heaps alongst the intended lines. The re-draining is now charged to the new tenants at 5 per cent. on outlay. The reporter may be excused for inserting the following extract of a communication from the Duke's office at Braehead House, Kilmarnock:—"As usually the case with innovations and improvements, tile-draining was regarded at first as a very doubtful experiment by the farmers in this neighbourhood, and it was a proof of your father's liberal and advanced views in agricultural matters, that he had faith in the experiment, and was the first to make trial of it."

Draining has been pushed on very rapidly generally over Ayrshire since about 1845. The drains first put in under the government grant, at 3½ and 4 feet depth, with intervals of 28 and 30 feet between, were found worse than useless in the stiff clayish subsoils generally prevailing, as the farmers committed the gross error on Ayrshire heavy lands, of levelling the former rounded ridges, ploughing with wide breadths for the purpose of green cropping, and laying the land after into 15 feet ridges of a flat form, so that the ground between the drains actually lay wetter than before. This is being helped in many cases now by inserting shallower drains in the intervals. Mostly the draining done now with government money, is at 42 inches and 18 or 20 feet apart; and where done with the proprietor's own money, commonly at about 3 feet depth in every furrow (15 feet). On many farms of heavy soil, after being drained, the "Fairlie rotation" was thrown aside, wider acreage put under green crops, and guano substituted in great part, both for green crops and white crops, instead of the former mode of dunging and liming on the sward. During the course of the first rotation after drainage, the guano answered most admirably, and great crops of every thing were raised, but during the second course just elapsed, the guano-manuring in most cases has much disappointed the farmer's expectations. The land is now even barer of grass, and still stiffer to plough (although the grass-*seeding* joined with the green cropping, accounts partly for the increased bareness of grass). The guano encouraged farmers to plough more than they could properly dress with solid dung, and Ayrshire clays must have something or other to keep them open. Dung or lime effects a sort of porousness, but guano (with so much wet) allows the soil to run together, till it gets so close and soured that nothing will grow. Certain farms could be pointed out on which even the thistles and docks now just put in an appearance!

Caustic lime applied to the shallow-drained damp grass lands would certainly tend much to neutralize the sourness of soil, and to exterminate the sedges and other aquatic plants; and still more beneficial if in connection with a deepening of the drains. Twenty or twenty-five years ago, and for long previous, liming was carried on very largely in Ayrshire. It would not be difficult to point out now many farms which have been to a certain extent ruined by lime—that is, by excessive quantities of it applied during the first 30 or 40 years of this century, and such applications followed up by a most exhaustive mode of cropping. Severe cropping after lime is very hurtful on any soil, but upon poor, wet clays, it is actually ruinous. Three successive white crops, besides the never-absent ryegrass seed one, were far from being uncommon; and such deplorable farming is even yet occasionally seen. Large doses of lime laid on now upon these lands would probably do as much harm as good. They require first to be thoroughly renovated with farm-yard manure, better drained where needful, and then stimulated with moderate allowance of lime. The frequency and abundance of the common daisy in many very bare pastures evidences a sufficiency of calcareous matter. Although there is now a large and constant demand by the iron-furnaces, yet no county in the kingdom has better supply of lime, and it can be had for about 9s. per ton, in shell, laid down at any railway station, or within a mile or two of almost every farm in the shire.

Much is talked now and again about *permanent* grass, but we think that in most of the inward parts of Ayrshire, from 6 to 9 years under grass will be found permanent enough to be profitable. By all means, however, let the Ayrshire farmers have more *permanent meadow land*, for one cutting of hay and grazing after. Fodder for the cows must be had, and of course the grass must be broken up in regular rotation of time to supply that; but the grass land should be allowed to lie as long as possible, and no greater extent of grain crops grown than absolutely essential. The farmers should economise their fodder by the use of the chaff-cutter, and their roots as well by giving more compound meal, molasses, &c., and increase their fodder crops by laying out "irrigation meadows," and doing away with "*seed* hay."

There are considerable extents of wild meadow land interspersed throughout the high lying districts. The hay secured from the more marshy kind consists in great part of jointed rushes or "spretts," along with other very innutritious plants, yet it is of great service to the partly or wholly stock-farmer as winter fodder, and very many of the upland farmers depend almost entirely for their winter keep upon bog-hay, which, innutritious even as it is, is still superior to ryegrass hay, or the general run of oat straw. These bog meadows, if partially drained and limed, would grow magnificent crops of Timothy-grass, infinitely superior both for bulk and quality, to the present "sprett hay"—although it is but right to state, that during the last 25 years, large portions of many have been thus improved. In a dairy county like Ayrshire, the system of irrigating grass land for permanent hay crops is one of the most valuable of improvements. The produce of such meadow land in nutritiousness, where properly sown down at first, is vastly superior to either oat straw or thrashed rye-grass hay,—*that* will be granted by every one; and in possession of such a meadow, the dairy farmer could graze with his young bestial and a few sheep, the whole or greater part of his first year's grass from seeds, to the immense advantage of the pasturage after. Water meadows entail no expense for manure. All that is required after they are properly formed and levelled, and sown down, being a knowledge of the right times to lay on and take off the water. They annually furnish a large amount of useful and nourishing food, and the manure made from the animals fed thereon, goes to enrich the fields under tillage. There are few counties in the kingdom presenting greater facilities than Ayrshire for the profitable application of running water from passing rivulets. These receive the drainage water rich with fertilising matter, and there are hundreds of low lying fields on to which they could be conveniently turned, and the land converted at little expense, into most remunerative meadows There may be more, but the reporter is aware of only some half-dozen *artificial* (regularly formed and sluiced) meadows presently in Ayrshire. One he has known intimately for about 30 years, since it was made in fact, and by much the greater portion of the herbage now consists of Meadow Foxtail, with more or less of Timothy, Meadow Fescue, &c. The soil of this meadow is a deep medium loam incumbent upon moss, and it is still as productive, if not more so, as during its first decade. One year with another it will yield about 3 tons of first-rate hay per imp. acre, besides after-grazing for calves and sheep. The grass, however, is partly used green for soiling. A second cut of hay might be had, but cannot well be taken from the backwardness and wetness of Ayrshire climate, and after-grazing with young stock and sheep probably pays better.

Besides the regular sheep and cattle hill-pasture, there is a large acreage of *old permanent grass* of first-rate quality, generally attached to and mostly in the immediate vicinity of landowner's seats, amounting to—say 7 or 8000 acres. This is annually let by public roup, and taken by farmers and cattle-dealers as summer-grazing for their young stock, &c., at varying rents, according to quality and times.

We have to say, ere concluding this section, that the remarks upon ryegrass seed-saving have no reference to the farm practice of most of the farmers in the seaward districts. Their young grasses are generally good, and in great part grazed, less hay being made as we near the coast. The following are a few mixtures of seeds as sown on farms in various parts of the shire, and on which the first year's grass is either early green-cut for hay or for soiling horses fresh from the field, or grazed, generally by sheep. Quantities per Scotch acre, unless otherwise stated. Grass seeds are mostly all sown by hand, very few using machines.

Mr. Hugh Woodburn, Annandale, Kilmarnock: for one year's hay and 2 year's pasture following, sometimes 3 year's pasture—2 bush. ryegrass, 4 lbs. white clover, 2 lbs. red, 1 lb. alsyke, 2 lbs. meadow fescue, 1 lb cocksfoot, 1 lb. timothy. Soil, a strong loam.

Mr. John Cunningham, Trees, Maybole—either for hay or pasture, but two-thirds grazed for one that is made into hay; grazing 2 years—1½ bush. rye-grass, ½ bush. Italian do., 4 lbs. red clover, 3 lbs. white, 2 lbs. alsyke, occasionally a little yellow, and on his blackish land from 1 to 2 lbs. timothy. Soil various; see second Section.

Mr. James Wright, South Sanquhar, St. Quivox; for 2 year's grazing after barley on a sandy-loam—2 bush. ryegrass, 3 lbs. white clover, 2 lbs. red, 2 lbs yellow, 1 lb. alsyke. For one year's hay on strongish loam—2 bush. rye-grass, 7 lbs. red clover, 2 lbs. alsyke.

Mr. John Hamilton, Monktonhill, Troon; for 2 year's grazing—1¾ bush. ryegrass, 3 lbs. white clover, 3 lbs. red, 2 lbs. yellow, 1 lb. alsyke, per imperial acre. Soil, a deep light loam.

Mr David Cuninghame, Chapelton, West Kilbride; for 2 year's grazing, mostly, but a small part of the first year made into hay—1½ bush. ryegrass, ½ bush. Italian do., 3 lbs. white clover, 3 lbs. yellow, 2 lbs. red, 1½ lbs. alsyke. Weak, but quick light land.

Mr. Robert J. Thomson, Grange, Kilmarnock; for 1 year's hay, early green-cut and a second-cut following—1½ bush foreign Italian rye-grass, 1 bush. annual ryegrass (heavy seed), 2 lbs. cowgrass, 2 lbs. alsyke clover, 2 lbs. red clover, per. imp. acre. Soil, a strong loam, resting chiefly on yellowish clay. Mr. Thomson top-dresses the oat-stubble in autumn with about 12 carts town's dung per acre for the hay-crop; and, again, with 2 cwt. sulphate of ammonia early next summer

Mr. Andrew W. Ralston, Lagg, Ayr Heads, Carrick; for 2 years' seeds in 7-shift, first year part hay and part grazed—1½ to 2 bush. ryegrass, 4 lbs. white clover, 3 lbs. red, 2 lbs. alsyke; generally good strong loam, but in one or two fields the "trap" rock comes in some places within a few inches of the surface. For 3 year's pasture on his high-lying sharp tree soil—1½ to 2 bush. ryegrass, 6 lbs. white clover, 3 lbs. yellow, 2 lbs. red, per Scots acre.

Mr. R. M. Cuninghame, Shields, St. Quivox; two years under seeds, half of the first year hay and the other half grazed —1 bush. ryegrass, ½ bush. Italian do., 3 lbs. white clover, 2 lbs. red, 1 lb. alsyke, 1 lb. yellow, 1 lb. cowgrass—the hay portion of the break getting 2 lbs. more red, and 1 lb. less white, clovers. Soil, light land; various; see Section 2nd.

The above are all *bona fide* mixtures as sown by the several farmers, although the writer does not give them by any means as in his opinion perfect specimens of seeding. The clovers even on our coast farms are too short in quantity, and miserably so farther inland. But probably it would not be of much use to sow larger quantities of the clover-seeds so long as the present *thick-sowing* of the *cereals* prevails. The land in superior condition, and a less measure of cereal-seeds per acre sown, a full plant of clovers and grasses might then be depended on,—granting that a full quantity of seeds were given. Crested dogstail is unquestionably the best of the pasturage grasses for general soil-adaptability, specially for sheep, and resisting drought also better than most of the fibrous-rooted sorts. A proportion of its seeds—say 6 lbs. per acre—included, and near to three times that weight of the ryegrass deducted (1 lb. dogstail being equal at least to 3 lb. ryegrass) in the 5-year rotations with 2 years grazing, as at Monktonhill for instance, or in any other *grazing* mixtures, would be a great improvement on the fattening quality of the pasture. A lb. or two per acre of plain parsley also on these lightish lands is most beneficial for the young sheep. It is not alone the value of the parsley herbage as a condiment, but the thick, fleshy, parsnip-like roots remain in the soil as good vegetable manure.

Mr. J. Pettigrew Wilson, of Polquhairn, Ochiltree, has used timothy-grass seed in large degree for the past ten years. He began with 5 or 6 lbs. to the acre, but latterly has increased the timothy to 10 or 12 lbs. per acre, lessening the ryegrass. In 1860 he sowed down a 16-acre field *without a crop*, using 20 lbs. of timothy per acre, with a proportion of ryegrass, and white and alsyke clovers; and although from the wetness of season the land was not got so fine as wished (being fallow), still the hay-crop was good, and the pasture is now excellent. Many others, farming clay lands, are now sowing a little timothy seed, but they use it in far too small proportion. They might as well sow none as 1 lb. per acre, for the effect of such a snuff is never seen in the pasture. Timothy and crested dogstail are two of the best pasture grasses for Ayrshire farmers generally, and the former is also a very superior hay-plant to the ryegrass. Their seeds besides can usually be had fresh, which is a point much in their favour. There is no great use in recommending "natural grass-seeds," such as, the fescues, the poas, cocksfoot and foxtail, till once our farmers begin and raise these themselves, or till such demand exists as that they can be got fresh from regular *home-growers.* There is no doubt as to the superiority of those species as hay and pasture plants over the ryegrass, but there is just as little uncertainty with respect to the great inferiority of their seeds as presently to be had. So long as we are so much dependent on "foreign" grass-seeds (or, *trash*, rather), so long will all wise farmers *scunner* at using them, and no wonder.

More farmers should follow Mr. Wilson's example by sowing down their lands in autumn or spring, without a cereal crop, and after a green-crop or fallow. The increase in the hay and sequent pasturage would more than compensate for the loss of a white crop. More seeds per acre must be sown when without a cereal crop, and the thicker planted the better, so as to keep out mosses and weeds; and the land being in good heart from the previous green-cropping, is competent to maintain the close matting of grasses in flourishing condition. Much seed is wasted by sowing on rough land without a previous rolling. In every case the surface should be smoothed before sowing seeds, and just simply scratched after with *very* short-tined light harrows.

Mixture of seeds for sowing down Ayrshire clays, heavy and medium loams, and upland grey soils, without a cereal crop.

Names	Lbs per imp. acre, and cost.				
	Clays and loams.			Moorish grey soils.	
Ryegrass, of a *light* weight, per bush.,	20	3s. 3d.	...	20	3s. 3d.
Timothy grass,	12	6s. 0d.		10	5s. 0d.
Crested Dogstail grass,	3	3s. 0d.		3	3s. 0d.
Hard Fescue grass, .	...	...		2	1s 2d.
White clover, . .	8	6s. 8d.		6	5s. 0d.
Yellow clover, . .	1	0s. 5d.		3	1s. 3d.
Alsyke clover, . .	3	3s. 6d.		3	3s. 6d.
	47 lbs.	for 22s. 10d.		47 lbs.	for 22s. 2d.

On the more fertile loamy soils, a proportion of meadow fescue, cocksfoot, rough poa, &c., would doubtless be beneficial; but the writer would strongly urge farmers to test the growing quality of the seeds of those ere purchasing.

If ryegrass seeding *must* be persisted in, why not take the seed crop in lieu of a cereal one, and thus the soil would not be so much exhausted. Sow at the rate of nearly 3 bushels of ryegrass per acre for seeding, with 6 lbs. timothy, 3 lbs. dogstail, and 6 lbs. white clover, for the benefit of the following pasture. *That* would surely be an improvement on the present system. Raising of ryegrass seeds for a few years back has certainly been paying much better than growing oats or wheat, but will the present high prices for ryegrass seeds be maintained? Simply impossible. They are the result in great part of strong personal competition amongst the two or three wholesale seed buyers, who have (in reality) been losing money by it for some years; and, further, owing to the late high prices, the practice has been extending so much in Ireland and elsewhere, that in a year or two, if the extension goes on as presently, more seed by much will annually be saved than necessary for the sowing of the whole three kingdoms, and plenty to spare for the continent and colonies besides. Talk of distilling *gin* from ryegrass! How would it pay distillers to purchase ryegrass seeds at 30s. or more per 210 lbs., when they can get 280 lbs. of oats for 15s., or 450 lbs. of barley for 27s.?

SECTION V.

AYRSHIRE COWS—MILK—BUTTER—CHEESE—VEALS AND YOUNG CATTLE—SWINE —PET-SHEEP—"BOWINGS"—FARMERS' CLUBS, &c.

THE dairy stocks of Ayrshire cows are by much the leading feature in the husbandry of this county, and the farmers are deservedly proud of their symmetrically formed and famed milk yielders. The "Ayrshires" are now very generally acknowledged as the best breed of cattle for dairy purposes in Great Britain. At all events they are much better adapted for the comparatively scanty pastures of Scotland than heavier bodied breeds, such as the Herefords, the Devons, and the shorthorns of England. The origin and gradual formation of the breed is almost unknown; but it is a matter of very slight importance to us moderns, who first introduced them or how they originated. Very probably the blood of "the cow with the crumpled horn" —that tossed the dog, that worried the cat, and all that—viz., the Holdernesse or the Alderney cow, had something to do with the process of "natural selection?" Crumpled horns, however, are now looked upon as a grave defect in Ayrshires. Horns are merely dangerous ornaments, and, as breeders well know, can be *moulded* to any form to suit the taste of the times. The Ayrshires are now general over the county; there not being more than a few scores of the old black Galloway breed left in the extreme south of Carrick.

The "points indicating excellence in Ayrshire cows," as fixed by a committee appointed by the "Ayrshire Agricultural Association" in 1853, will be appended to this report. Sufficient now to say, that, in respect to elegance of shape, &c., the Ayrshires have probably been brought as near perfection as is possible for beasts of their size and make to arrive at. This has been effected mostly by the continuous efforts of the parish farmers' clubs, chiefly during the last 25 years, but more or less for many years previous. Every one of the 46 parishes having its local "society," besides "estate clubs," and the whole attention of the members of each of which seeming to centre in their annual show of dairy cattle. They have annual "ploughing-matches" as well no doubt, and also competitions on a small scale for dairy produce, grain, &c., and that such should be is quite correct and proper, remarking, *en passant*, that Ayrshire ploughmen as skilled workmen, are famed over the kingdom; but it may be hinted, that, if the members at their meetings would devote more time to the discussion of agricultural improvements, and comparing notes on farming matters generally,—talking less about the special make of such a bull's horns, or the flowing outline of such another cow's tail,—one principal object in view of these "clubs" when started would be nigher attainment. As Lord Palmerston remarked lately, "Agriculture, like every other industry, is promoted by the interchange of ideas, by the mutual intercommunication of knowledge by one man telling others what he has done, how he has succeeded and how he has failed." The "Kilmarnock Farmers" is the oldest of these local clubs in the county, established in 1786, and presently is in a most flourishing condition, owing chiefly to the recent "revival" amongst the cheese makers. The next two, most venerable and important, are the "Carrick Farmers'" of Maybole and the "Ardrossan Society," both more than 50 years old. After these come the "Girvan District Society," the "Cumnock Farmers," the "Beith Farmers," &c., &c. At a late meeting of the "Ardrossan Society," Captain Moffat offered a £5 prize for the best essay on the 'Management of High Clay Soils," which has been gained by Mr. Allan, of Munnoch. That is right. *Rump* soup in moderation is very good, but continual discussion of cow's tails, or such like, is simply nauseous. The "Symington Society's" custom of giving prizes for the "best and cleanest pastures" is good, and ought to be more generally adopted. Due credit must be given to the parent society of Britain, the "Highland and Agricultural.," for the kind and motherly aid afforded to her numerous offspring throughout the country, in medals, &c., and which indeed has been a great means of keeping many of our Ayrshire local clubs afloat.

The County "Association" again brings together and contrasts many of the crack animals out of the several parishes at its great annual show in April at Ayr, where much higher prizes are offered. The Ayrshire, among the local associations of Scotland, takes a high rank. Were there fewer small local clubs it would be still more potent, but probably as much good is effected by the neighbourly emulation amongst the members of the parish clubs as they are. The Ayr County Show of the

Ayrshire breed of cattle, for general excellence in whole, young and old, cannot be equalled anywhere. The exhibition for 1865 was the 31st consecutively, and at which premiums and medals of the total value of £350 were awarded,—the entries of cattle, sheep, horses, and pigs, being 662 head in all. Occasionally a limited number of as good, or perhaps even one or two superior, animals, are shown at the meetings in Lanarkshire or other districts, but these are usually picked up at extravagant prices from some of the Ayrshire breeders. It is curious to note how in such a large shire, containing fully 3000 separate collections (number of occupants in Ayrshire is 3300), and most being singly owned, the county prizes so uniformly year after year fall into the same hands amongst the comparatively small number of competitors. Not from any scarcity of really good animals in other byres, for they abound throughout the county, but because the owners of these, either from not being members of the "Ayrshire Agricultural Association," or often from a disinclination to shove themselves or their beasts forward, do not compete at the county show, although they do so regularly at their own more private parish ones. A reserved and retiring habit of disposition (averse to public display), is characteristic of the Ayrshire dairy farmers generally, even more than of the same class of men in other *Scotch* shires—probably a relic of the old *covenanting* times. This is specially observable in the men of Cunningham and Kyle; those of Carrick generally having a strain of Irish blood in them, and being more impulsive. Not that the former are less capable on that account (rather the reverse) of being good farmers, or of keeping themselves *bien* in circumstances—although, truly, with present rents and backward seasons, most of them are gruesomely pinched to make both ends meet.

Strangers acquire but poor ideas of Ayrshire dairy-stocks from a flying visit to one of the Ayr shows. The 300 head or so of all classes exhibited, can scarcely be called a fair sample to judge by of a total stock numbering about 80,000, young and old. The most elegant prize cows are frequently not the best milchers. Some *auld crummies*,—which, if placed in the yard, the judges would walk past with noses turned heavenwards,—on the same feeding as these prizers, will beat them out and out in giving a regular and lengthy yield of big luggiefuls. *Prettinesses* don't load the cheese-shelves—barring aye, of course, the aid of the dairymaids, charming creatures! Although the writer may lay down his views with some authority, on grass-lands, grass-seeds, and grass-seeding, as in the preceding section, these having been his lifetime's study almost, he does not pretend in the least to put *his* small knowledge of milch cows in comparison with that of such judges and breeders as—Mr. John Parker, Broomlands, Irvine; Mr. Wm. Caldwell, Boydstone, Ardrossan; Mr. James Howie, Burnhouses, Moscow; Mr. James Picken, Laigh Langside, Craigie; Mr. Hugh Rodger, Attiquin, Maybole; Mr. Thomas Dow, Hawkhill, Dailly; Mr. Wm. Kirkwood, Shankston, Patna; Mr. M. Richmond, Currarie, Ballantrae; Mr. Peter Gemmell, Todhill, Fenwick; Mr. Hyslop of Bank, New Cumnock; Mr. John Hamilton, (of Burnbrae), Woodhead, Galston; Mr. James Pollock, Raws of Grougar; Mr. John Drummond, Camsiscan, Tarbolton; Mr. James Findlay, Lyonstone, Maybole; Mr. Peter Connor of Cahoole, Dalrymple; Mr. Robert Caldwell, Knockshoggle, Coylton; Mr. Geo. Young, Mains of Kilmaurs; Mr. James Craig of Craigdarroch, New Cumnock; Mr. Wm. Muir, Marshland, Beith; Mr James Brown, Cartleburn, Kilwinning; Mr. John Kilgour, Noltmire, St. Quivox; Mr. John Campbell, Knockjarder, Dalrymple, &c., for instance; yet he may be allowed to express an opinion, and it is the opinion of many old experienced dairy farmers, that too much stress is laid on mere beauty or handsomeness of form and colour, and too little attention paid to milking-power. A move was made in the right direction at Ayr show two or three years ago, at the suggestion and expense of the late Duke of Athole, when a large prize was offered for that cow which gave the best pecuniary return from the aggregate of several successive milkings. Most decidedly, that cow which gives the largest return in butter or cheese, upon equal feeding and for the whole season's milking, is the best milch cow, whatever her "points" may be. Too little circumspection in the choice of cows for holding on is given by our farmers. If the milk from each cow was regularly subjected to close scrutiny, and only those kept on whose milk bore the test of rich quality along with good quantity, a vast amount more money might be realized in the aggregate. A capacious, well-formed, and well-set udder, is certainly the chief point of excellence to which a purchaser should look, who intends to earn his living from the cow's produce, whilst quietness and docility of temper probably rank second. As a general rule amongst Ayrshires, the larger cows yield more milk than the smaller ones, but for several years back the tendency of selection by the judges at cattle-shows has been to lower the breed in size, and which, of course, affects the cows injuriously also as beefers. The purest stocks of Ayrshires are in Cunningham and the northern parts of Kyle.

The grass should always be allowed a fair start, but the ordinary time of putting the cows on is the beginning of May, and most of them are drying up in the beginning of November, so that only six good milking months can be reckoned upon in the year. The earlier the cows calve, they dry up the sooner, and *vice versa;* although the milk may be greatly prolonged in either case by plentiful house feeding. Except on farms in close proximity to towns, where a ready sale of milk or butter can be depended on, early calving is the reverse of profitable. Generally over the county the time of calving is most convenient and remunerating, for the earliest to begin from a month to 6 weeks before the grass is ready; and what number of calves may be reared are thus most of them about off the milk when cheese-making commences. But such farmers, for instance, as Mr. Thomas Speirs, Skerrington Mains, Hurlford, and Mr. Hugh Woodburn, Annandale, who dispose of the whole produce nearly in the form of milk or butter, time their cows to begin to calve so early as before the new year, and thus have a continual supply all year round for their customers.

The quantities of milk drawn daily from the cows varies considerably in different animals, and also at different times of the year in the same animal, according to the state of the pasture or the measure of other food she may be receiving. The reporter cannot set down the average daily yield of milk from each cow, all over Ayrshire, and for six months of the year, at more than five Scots pints, equal to 15 imperial pints. He is perfectly aware that is below the amount given by most writers on the subject, yet is confident that 5 Scots pints is if anything above the average, even for the period stated. Various writers speak of 8, 10, and 12 Scots pints, daily, or even more, and all that is very true in some individual cases of extra-good milchers, for a short time in the height of their milk and the grass at the best. Professor Lowe estimated the total yearly yield of a cow, in good dairies and on good farms, at 6000 imperial pints, which amount, allowing 210 milking days, gives us 9½ Scots pints per day for 7 months! There is not a kind of cow on the best grass farm in the kingdom which will yield such a quantity regularly for that length of time. It just amounts to about twenty pound's worth of full-milk cheese from each cow! A writer in the *Mark Lane Express* (May 1863) stated the average annual produce of cows at 4400 imperial pints each. Should his average be anything near the truth in respect to Britain at large, then all the reporter can say is, that the Ayrshire pastures, generally and proportionally, must be more defective than even he supposed them, and that is poor enough in all conscience. Our estimate for Ayrshire, over all, would be about 3400 imperial pints from each cow per annum.* The fault of the small average produce over the county,—if it *is* small compared with other dairy counties,—must not attach in any degree to the cows in that they are unable to yield more, but should be placed mostly to the general poor state of the grass, and somewhat to a deficiency in house feeding.

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* In Morton's "Farmers' Almanack" for 1866, the average annual yield per cow in five known dairies is given as 4992 pints, but which is stated as being above the average of *ordinary grass-fed* cows. A Gloucestershire dairy is said to yield about 4320 pints per cow, although we find that the average yearly yield of milk per cow at Frocester Court farm near Stonehouse, in a dairy of 80 cows, was 3862 pints for year 1863, and only 3360 pints for 1864, owing to the drought in the latter year.

Much depends upon the assistant feeding for getting good and regular yield of milk. It is possible that house food may be given in such measure as that the cost will owergang the profit, but with cheese selling at 12s. per 24 lbs., and good bean-meal or maizemeal to be had under 20s. per 280 lbs., or oats for 15s. per qr., house feeding might be profitably increased over that presently supplied on the majority of farms. Not only is the quantity of milk increased from extra house feeding, but the quality is also improved, and part of the expense is paid back in the richer manurial composition of the dung. Salt given regularly to dairy cows increases the flow of milk, besides rendering the milk richer in butter and curd, and the allowance to each in the best English dairy districts is from 3 to 4 oz. never exceeding the 4 oz ; yet such a beneficial practice is almost unknown in Ayrshire, although salt can be had at 9d. per cwt. Probably just as well, for the cows must have *good* allowance of food when salt is given along with it. It excites an appetite, and unless that appetite be supplied, the beasts lose flesh even more rapidly. Mr. Thomson, of Grange, who manages in every department most systematically, effects great saving of fodder by having it cut into chaff, and often keeps his cows for weeks together, without roots, by substituting 12 oz. of treacle daily along with the cut straw and meal. His average daily allowance of beanmeal, whilst being given, is about 4½ lbs., and of roots, 56 lbs.

The cows, when put on the grass, are *generally* in the leanest condition of body. They get in most cases literally nothing from the time they dry up until a week or two before calving but bare oat-straw and water, or, sometimes that equally nourishing (!) food, thrashed rye-grass-hay, is substituted, if the oat-straw runs short. And thus the summer-flush and best of the grass, during May and June, mostly goes to reclothe with flesh their wasted frames. Though it is their nature to secrete a large quantity of milk for the first two or three months after calving, the poor beasts are neither in condition of mind (so to speak), nor of body, to yield milk freely and copiously. The cows now in Ayrshire are nearly in all cases most comfortably housed—in many cases better than their masters and mistresses—and are generally well supplied with dry litter to lie on, and fresh clean water to drink; yet if a fuller allowance of more nutritious food was given them, not only during their dry months, but throughout the whole year, the cost would not be money thrown away: "the cow gives her milk by the mouth."

Varying according to season of year and quality of milk, about 190 imperial pints, on an average, turn out an Ayrshire stone, 24 lbs., of new sweet-milk or full-milk cheese. Fifteen pints per day will thus give us 14½ stones of new cheese from each cow for the six months, or 18 stones annually from each cow if all the milk was converted into cheese. The season's make of six months in some of the best grazing districts, as in the parishes of Kilmaurs, Stewarton, Dreghorn, Dailly, &c., may average fully 16 stones; but against these we can easily find other cold-clay districts, as in most parts of the parishes of Kilwinning, Mauchline, Dalry, Sorn, Stair, Coylton, &c., where the average will not exceed 12 stones. Take it another way: suppose that all the stocks of 20 milch-cows, over the county, turn out on an average one cheese daily of 36 lbs. weight for the season of six months, *that* gives us only 13½ stones to each cow.

The reader will observe that "*new* cheese," is the term used above. The cheese *dry in* and lose weight the longer they are kept. The amount of *indrink* may be from one-twelfth to one-sixteenth part of the whole,—that is, if the whole "kane" is kept on hand by the farmer till about Martinmas. The custom in most cases, however, is to sell the whole season's make sometime during June or July, and deliver the cheeses into the merchants' stores as made, in two or three separate lifts, so that a share of the indrink thus falls upon the merchant. Half a stone of indrink may therefore be placed against the make from each cow. Cheese fairs (three annually) were lately established at Kilmarnock under the auspices of the "Ayrshire Agricultural Association," the principal one being held on the last Thursday of October, but these have been poorly supported as yet by the farmers, only some 20 to 25 tons being brought forward on an average at each, and it may be years (if ever) ere they come to be much patronized. Farmers, as a rule, will not readily "happ" or "wyenn" in any direction save that which pleases themselves, and haply in most cases rightly so, as *they* ought to be the best judges of their own business. *Auld use and wont* practice holds the reins with very many, and this it is, we believe, not the high prices so much, which continues the ryegrass-seeding custom in these advanced times of farming.

The average number of cows in milk in Ayrshire in 1856-57 was 38,573, but we may reasonably suppose a greater acreage now under grass, from green-cropping and corn crops gradually diminishing of late years, and that more milch cows consequently will be kept—say 40,000. These, at 3,400 pints of milk each, or 17½ stones of cheese (allowing for indrink) each, at 54s. per cwt., will give the value of the annual produce in milk—viz., £405,000; to which add the price of 39,000 newly-dropt calves (allowing for abortions) at 7s. each, or £13,650, and we have the total value of the annual produce from the milch cows—viz., £418,650. The £405,000 from the milk may be apportioned as follows:—Sweet or full-milk cheese, £320,000; half-and-half and skim-milk cheese, £25,000; butter, butter-milk, sweet-milk, and skim-milk, £40,000; milk given to the calves reared, £20,000. The *whey* for feeding pigs, over and above. The "comparative insignificance of the cheese-interest," so remark occasionally Messrs. Primefat, Bullocks, & Co. of Dunse and Dunfermline. Not so *very* insignificant, gentlemen, as ye would *like* to think it.

Value of total annual produce from milch cows, . .		£418,650
Number of grass-fed cattle annually sold and exported — say 9,000, young and old, at £8, 10s per head, exclusive of the 7s per head formerly charged as calves . .		76,500
Grass-fattening of sheep of all ages alongst the coast, and pet sheep, drafted ewes, &c, inland . .		10,000
Value of the whey for pig-feeding, ...		18,000
		£523,150
Deduct—		
Value of the cabbage acreage, ...	£8,000	
Value of the mangold acreage, ...	16,500	
Value of the vetches acreage, ...	2,000	
Value of beanmeal and other feeding stuffs given to milch cows.	15,000	41,500
The fodder is compensated for by the manure.		£481,650

Divide the last sum by the acreage in rotation-pasture, including the rouped permanent-grass—135,000 acres, and we get the sum realized per acre of grass-land over the county—namely, £3, 10s., or an approximation to it at all events. From the £3, 10s. per acre deduct rent, servants' wages and board, keep for the farmer and family, lime, deaths of cows, &c., and a nutshell will hold in copper all that is left "to bank"—if anything at all. A living may be made by dairy-farming in Ayrshire, but to "make money" by it is plainly impossible. The dairy farmers are pretty comfortable, however, for all that, and the outcry occasionally sent forth, more so we suspect than their stock-and-crop brethren in the shore districts; but they have far from a "gentleman's life" of it, in the usual acceptation of that term,—themselves, wives, sons and daughters, literally "from cockcrow till noon, from noon till dewy eve," and all the year round, being worked like slaves. Still our farmers' sons, and daughters as well, are generally well-educated, and they are none the worse of the hard work; and no county in Scotland sends out so many young men as land-stewards, &c., to England and Ireland, proportionally even to size of county, as does Ayrshire.

Butter making in Ayrshire, except for shire consumption, and when contrasted with cheese, is of but small importance, the farmers of Renfrewshire and Lanarkshire doing in butter to a much greater extent proportionally than those of this county. It is not necessary to go into details of the mode of butter making, as these differ in no way from those followed in other shires, and some making it of better quality, some of worse. In respect to the *practical working* of the butter, the reporter fancies that the gudewives and lasses of Ayrshire will stand at par with most makers in the kingdom. However, since the annual "Great show of dairy produce" in October was started in Kilmarnock, the quality of the butter shown has been yearly improving, especially of the *cured;* and in proof of which, three of the most famed Lanarkshire makers exhibited in 1864, but failed in carrying off a prize. At the above "Great show," one of the classes for cheese is open to Britain and Ireland, a few for both butter and cheese open to Scotland, most of the classes open to the three shires of Ayr, Kirkcudbright, and Wigtown, and one alone confined to Ayrshire. It is the largest existing show of the kind; the number of separate lots or "entries" (1 cwt. each, at least, or above, mostly, for cheese) competing in the cheese classes, representing an amount of fully 1,000 tons in the dairies from which they came. In 1863 the entries for butter were 197, in 1864—240. For cheese in 1863 the entries were 531, in 1864—636. The money prizes awarded in 1864 for cheese amounted to £100; ditto for butter to £36 10s.; besides gold, silver, and bronze medals, and commendations. This show, like the great cattle one at Ayr, is under the charge and got up by the "Ayrshire Agricultural Association;" and much credit indeed is due to the worthy and most indefatigable secretaries, the Messrs M'Murtrie of Ayr, for the yearly increasing success attending both. Butter, like cheese, for its quality, is much indebted to good house conveniences and fit utensils; so that every thing can be done at the proper time, every thing put to its proper use, every thing put in its proper place, and every thing kept thoroughly clean. Churns of all kinds and sizes, and also cheese presses, are manufactured in almost every village; and at most of the larger butter-making dairies the churns are attached to and worked from the thrashing-mill, or otherwise by machinery. We have heard of one or two dairies in the Cumnock district taking butter from the whey, but that sort of thing is hardly known in Ayrshire. It pays better, with less trouble, to give the whey to the swine as it comes off the curd. Readers of newspapers frequently see butter advertised under the name of "stubble butter," and as of extra good quality; but the butter made after harvest is not indebted for its goodness to any little picking the cows get amongst the stubbles, but some what to the cabbage house-feeding at that time, and chiefly to the richer composition of the *small* quantities of milk *then* yielded.

It depends entirely upon the farmer's run of customers, and being conveniently situated, whether he will churn the whole milk, and sell the produce in the form of butter and butter-milk, or churn the cream only and have skimmed-milk to dispose of. If the butter-milk can't be got sold (rarely the case), it may be used for feeding pigs—a profitable investment enough; and the skimmed, if not sold, can be converted into cheese—a kind of diet the less said about the better. Some try one way, some another, and for some years bygone some have been trying all ways, and pinched after all to get their rents scraped together, poor souls. Butter making has generally been considered the more lucrative mode of turning the cow's produce into cash, but with the good prices for cheese of late, and looking to the extra women's wages, extra house-food, and extra trouble, connected with butter and milk selling, the writer is of opinion that cheese making, meanwhile, is equally as profitable. A few carry on a mixed sort of system whereby more or less of the cream is turned into butter, agreeably to amount of demand and the relative price at which butter is rating, and the remaining milk and cream made into cheese, so that the latter product may be "half-and-half," "three-fourths-full," or *nearly* "full-milk," according to quantity of cream abstracted. A medium quality of cheese will always be in demand, as the largest consumers of cheese in Scotland are the working-classes, and they look about as much to price as quality. Besides, this mixed system, is the most profitable for a good many of the cheese makers who are not first-class, and although looked upon rather suspiciously by the dealers, yet nothing can be said against it. Cheeses are not sold like pigs in pocks. Before purchasing, they can be handled, and paled, and tasted, by the merchant, and, if he is not competent to price any quality of cheese, one with another comparatively, he is not fit for his business. There is no fraud in a farmer making his cheese of any quality, colour, shape, or size, he may think proper, but he must not (in absence of the article) sell a thing for what it is not. In respect to the great mass of makers, however, there is as much cream got from the " skim-milk" used by the farmer's family and servants as affords the modicum of butter required for home use, and "sweet-milk Dunlop cheese" is in nearly all cases, as represented, *full-milk*. The farmers—or, rather, their wives—generally, indeed, are extra honest on this point. Cheeses are made Sundays and Saturdays.

The practice of letting the milch cows "abowing" is pretty common throughout Ayrshire, particularly in dairies on a larger scale. This consists in the farmer letting his whole stock of cows—or, if he holds two farms, the stock pasturing on the out-farm, it may be—to a professed milkman at so much per head per annum. The farmer provides all requisite accommodation for the cows, and for manufacturing and storing the produce; a dwelling-house for the "bower" and family; all the dairy vessels and implements; and as much summer grazing, with certain specified weights of house food, as may be agreed upon,—fodder and chaff being usually allowed at discretion; whilst the bower takes the whole charge and manage-of the cows, and runs the risk of a greater or less return from the season or other causes, but permitted to change the produce into cash, by whatever system seems to him best. Any cow getting blind in the paps, or otherwise hurt, is removed by the owner and a fresh one supplied; and the number of calves to be brought up is according to bargain, or else a drawback is allowed for each calf reared. Present rents per cow range between £8 and £11, but the rent much depends on the quality of the grass, and the quantities of feeding stuffs and roots bargained for. These rents enable us to see that, the cows set abowing must generally give rather more than 5 Scots pints per day for *out*-season; but "the bowers" are sharp fellows, seldom taking cows but on really good grazing farms, and with them the grass is always supplemented by good allowance of house food.

By the above practice the utmost is realized out the cows. The bower and his wife, and daughters as well, perhaps, giving their undivided and most careful attention to the dairy, can make more by it than the owner possibly could do, with all the other branches of farm business resting on his mind; and these, as well as the dairy-servants, needing constant and separate oversight. Hardly will a dairy stock of cows make sufficient return of profits for even the moderate maintenance of a family, unless under the daily and steady supervision of the farmer himself occasionally, and of his wife and daughters at all times.

From one-third to one-half of all the calves are annually reared on each farm. These are generally quey-calves, excepting perhaps one, or two bulls at most. The others are usually sold to butchers as "slinks," and a wretched state of meat it is to set before any rational being. The newly-dropt calves or "slinks" ordinarily fetch from 5s. to 7s. each, although presently (March 1865) they are selling at from 7s. to 9s., and the farmer receives back the "yearning" or stomach. There are always a few calves fed here and there, but veal feeding is far from being common in Ayrshire. With the good demand existing, it is probably more profitable to make butter in the fore-end of the season, till the cows are all calved and the grass well forward. It is the gastric juice with which the skins of the stomachs are impregnated that gives out to the water in which they are steeped (forming "rennet") the coagulating virtue, and the stomach of a calf fed for a fortnight or so, must of necessity be more strongly impregnated than that of one having got only two or three meals. Occasionally the "slinks" do not get even one meal of milk, but are sent off direct. Slink veal has at least one good property, however,—that of moderating the surgeon's bill for salts (epsom)! Too little attention, generally, is bestowed in the selection of those quey calves for rearing, only from the known good milchers of the stock. Cows occasionally "pick-calf" (abortion), and when that happens with one, the other calvers in the byre from involuntary sympathy are prone to follow suit. A cow having once "picked-calf," may as well be immediately fattened off or .parted with, as she is not likely to be profitable for the future; and that is another good quality of the Ayrshires, that they at any time and any age readily fatten and pay well as beefers.

The young calves get warm milk morning and evening for the first 6 or 7 weeks—drinking out of "luggies," as no suckling is allowed—and for some time longer a less rate of milk or whey, with linseed-meal, bruised oil-cake, or other food, stirred in; and getting latterly during the daytime the run of some sheltered croft or paddock near the homestead. Till rising three years old the younkers get in most cases just the run of the farm, lying out generally the whole year round, but where not regularly housed during winter, having at least partly enclosed sheds for shelter, and receiving allowances of the usual nourishing yett-strae diet. Many steadings now comprise "straw yards" with roofed sheds surrounding, in which the queys are wintered on the oat-straw and water; and during their third summer, a large proportion of them are grazed on old grass taken for that purpose at some of the public lettings formerly noted. The queys having been mostly brought up on very bare pastures, when exported to Ireland for instance, thrive amazingly afterwards upon the luxuriant grass lands of Erin. Making due allowance for all fatted off,—either young or old, male or female,—for deaths and abortions, &c., there must be from 8,000 to 10,000 head of cattle annually exported from Ayrshire, and presently fetching high prices, higher than they have been for many years back,—queys ranging from £8 to £12 each, and milch cows from £10 to £16, or more. At Mr. Ivie Campbell's annual sale (May 1865) at Dalgig, ten of his young Ayrshire cows averaged £19 5s. 9d. each, for Mr. Campbell is hardly less widely known for his good Ayrshire stock, than he is for his celebrated breed of greyhounds. Since the "International Show" at Paris in 1855, many herds of first-class Ayrshires have gone to France and other parts of Europe, and an increasing demand has existed through more years back from all parts of our own kingdom and colonies. Many of the upland (or, hill-country, rather) farmers, who have all good extents of old grass, bring up all their calves, besides buying in from their neighbours lower down; and those breeders who have acquired a name for prize cattle act in a like manner, purchasing wherever and whenever they come across a fancy young animal to their minds. The county has almost been clear of pleuro-pneumonia or other cattle diseases for several years bypast.

In all dairies of from 15 cows and upwards a bull is kept for service. The bulls are generally fattened, and sold when from 4 to 5 years old. If very good, or prize takers, they may be and are kept for several years longer, seldom becoming vicious when ageing as in most other breeds. "Geordie," by the more attentive farmers is usually confined to the house during the "rutting-season," and literally kept on clover so as to be in good *fettle* for "officiating," and the farmers (and haply their wives even more) thus know to a day almost when each cow should calve. The heifers usually take or get the bull when rising 3 years old, and properly ought not to breed at an earlier age as it stints their growth. An Ayrshire milch cow is in her prime about 6 years old, and continues in good milking condition till 12 years or upwards; but that depends greatly upon constitution, as some cows, like ourselves, age sooner than others.

Swine are fed more or less at every farm-house where cheese is made. Ayrshire heads the list in Scotland for number of swine kept and fattened—viz., about 12,000 annually. According to the "statistics," Dumfriesshire contains more swine than Ayrshire, but a large proportion of those in Dumfriesshire are sucking pigs. In Dumfriesshire they breed extensively, whilst in Ayrshire they do not. Our farmers, indeed, import great part of the young pigs from Dumfries and Carlisle. It is not easily accounted for why Ayrshire farmers do not breed more, as breeding of pigs in time past has certainly been paying better than fattening. Two litters a year off a breeding sow (deducting fee for boar), at 4 to 5 weeks old, being worth on an average about £10, and more of late years; and much less feeding will keep a breeding sow well than it takes to fatten a pig to 10 or 11 stones of 24 lbs. Generally the swine are fed simply on the whey, with any offal and vegetable refuse gathered up, till within 8 or 10 weeks of being killed, when they receive daily feeds of some sort of mash to fatten them off. They seldom or never get grass or green food, or get out their styes to have the run of a grass field as in some parts of England. Where so many swine are fattened, the reporter wonders that none of the farmers try a few rows of *field lettuce*. The "green-coss" and some of the "cabbage" sorts grow to large size if well dunged, and there is no kind of food of which pigs are fonder, or would probably thrive better upon. The soporific property of the lettuce would aid greatly in fattening. The custom generally is to give a morning feed of the fresh whey, and the rest of the whey is emptied into a cistern of some sort, in which it becomes acid, being considered less laxative and more nutritious in that state. The auxiliary food varies much on different farms, as boiled small or tainted potatoes, hashed oats or beans or maize, turnips or mangolds, thirds and bran and mill-dust, &c., sometimes given as a warm mash, and sometimes in mixture with the sour whey. A due portion of salt stirred in amongst the sour whey is most beneficial for fattening, but the quantity must be carefully regulated, and not exceed about 1 oz. to each pig twice or three times a week. The swine now on many farms are *much* better cared for than the milch cows!

With a stock of about 20 milch cows, from 6 to 8 swine may be fattened annually, weighing between 9 and 14 Ayrshire stones of 24 lbs each, exclusive of offal and skin; but the number much depends upon the amount and quality of other food given auxiliarly with the whey. More attention is now being paid to the breed of pigs bought in or reared, though there is still room for improvement on this head; but, at all events, the greater number of swine that one sees now, are very different from the lank, long-eared, razor-backed brutes, largely imported from Ireland not so many years ago. Within the last 10 years or so, too, their comfort and cleanliness have been much better cared for, by providing good slate-covered piggeries, and having their whole premises (covered and open) regularly cleaned out and freshly littered with dry straw; and the increase of warmth thus afforded assists in fattening as much as a larger allowance of food. Few kinds of live stock (if any) in Ayrshire, yield a better return for any small extras laid out on them, either of comfort or feeding; and, especially so now, with pork selling at from 11s. 6d. to 12s. 6d. per 24 lbs. The carcases are always sold fresh to the wholesale curers.

White-faced *pet sheep* are pretty common on the arable dairy farms throughout the county, varying from 3 to 5 on the smaller sized farms, and from 5 to 10 on the larger. Of what exact breed they are is hard to say. Of or belonging to the "Leicester" somewhat, in most cases, may best describe them. They fatten to great weights, and one or two are often killed before harvest to meet the larger kitchen demand occasioned by the *hairst-men.* Their wool for family use besides is very serviceable. Lambs are taken from the pet-ewes, and mostly having twins each. Six months old, these were selling in autumn (1864) as high as 45s. a piece. Many of the tenants are in the habit of buying a score or two of black-faced *slack* or *drafted* *ewes* ("crocks") towards the end of harvest, which are put upon the hay field after-grass (or, *stubbles*, rather), and the young grasses from seeds, or, in fact, are put to eat any roughness of foggage on the farm. These used to be got cheap, from £11 to £15 the clad score, and good profit was generally realized by the end of 3 months or so, besides the benefit to the fields—the ewes perhaps getting a few sliced turnips latterly if these were plenty. But *drafted ewes* cannot be had in these present times under 18s. to 20s. each. Many take in sheep (hoggs and ewes) to winter for their hill brethren, from about 1st November till about 1st April, and at rates of from 5s. to 7s. per head, according to quality of keep. We know of several who of late years have been lessening their dairy stocks, purchasing blackfaced ewes in autumn, wintering and taking lambs from them (Leicester rams), shearing, and afterwards selling both mothers and lambs towards the end of June; which system is paying well, and is a good means for improving the pastures. These some seasons past there was much damaged and weak grain in this county, fit almost for nothing save feeding stock, and such could not have been put to better purpose than 1 or 2 lbs. of it daily given to each sheep as above. Some distance eastward of all the iron furnaces, the sheep in that direction have their coats much darkened by the sooty smoke, but although this may be against the sheep and cattle in one sense, it is favourable in another, by improving the grass.

Poultry.—Large numbers of poultry (hens and ducks) are kept in Ayrshire, and although the masters may grumble occasionally, yet probably the gudewives are pretty near the truth in thinking that no kind of live stock on our small farms pays better. The principal butter and egg market is held weekly on the Fridays in Kilmarnock, but there are other weekly markets for these in various towns of the county.

SECTION VI.

The Dunlop and Cheddar Modes of Cheese Manufacture, and the two Systems Contrasted.

Ayrshire has long been famed for its "Dunlop cheese." To give a stranger a correct notion of cheesemaking, as generally practised in Ayrshire, the best way perhaps will be to go through (in fancy) one summer-day's proceedings in the dairy-house, and so far as the cows are concerned—interweaving some relevant remarks on this or kindred subjects. The details of manufacture first given are of the old Ayrshire or Dunlop method, still prevailing in the vast majority of dairies.

Reserving the very small holdings under forty, an average-sized dairy farm may be set down as between 100 and 120 imp.

acres; in Cunningham and Kyle at least, but in Carrick the same will be 50 acres or more larger. Such a sized farm usually keeps a milking stock of from 18 to 22 cows, turning out one cheese daily of more or less weight during the season. A large number of the stocks run between 20 and 30 cows; some few comprise from 30 to 40 or even more, but by much the greater proportion range within 14 to 20. Too many cows on a farm is no profit. A less number, and the more abundant pasturage consequent, always pays better in the long run; besides, the money shut up in overplus stock may be put to other (and paying) uses. Somewhere about five o'clock A.M. the morning milking of the cows takes place. The milk is carried direct in the "luggies" as drawn from the cows, and emptied through a very fine wire-cloth sieve (the "milsey"), or else through a thin canvass cloth, into a large "milk-boyen" or tub standing in the contiguous dairy-room. The cows being milked, are guided by the byre boy to the field or fields on which they may be for the time grazing. The fields generally are not more than about 6, 8, or 10 acres, in extent each—few exceeding 10 or 12 acres; although they are much larger on the green-cropping farms along the coast, and commonly in Carrick. Leaving the cows to refill their udders at their leisure as best they may, return we to the dairy-room.

The cream of the previous evening's milk is skimmed off, and the remainder being warmed in a vessel in the boiler to about or fully 100°, is then added through the sieve, along with the cold cream, to the morning's meal already in the tub, and raising the whole when added to an uniform temperature of from 86° to 88°. Milk as it comes from the cow is about 96°. After stirring in the "rennet," the milk takes about 30 minutes—seldom less, sometimes more—to properly "thicken" or coagulate. The milk of cows feeding on upland clayish pastures must be thickened at a higher heat than that from cows grazing on more fertile low-lying farms; and during very cold weather, or towards the end of the season, the temperature is always slightly increased. Thermometers are hardly ever used by any of the "Dunlop-makers." The proper warmth is determined by the feel of the fingers or hand, and it is wonderful how near they hit upon, and regularly keep to, that precise degree of heat at which they are accustomed to thicken. Most of the cheesemakers are the wives and daughters of the farmers, only a few of the larger farms, or gentlemen—or bachelor-farmers, engaging bred dairy-women: for in Ayrshire, unlike England, every process connected with the milk, the butter, or the cheese, is conducted by women, and rightly, too; and although most of the "gudewives" and their "dochters" may be much more at home in fingering a cow's paps than the keyboard of a piano, they are not on that account any the less better women, less loveable, or less thoroughly useful members of society. Rennet, as made in Ayrshire, is simply the strained liquid in which the cut-up salted stomachs of calves (popularly "yearnins") have been immersed for a few days, the water being usually boiled and allowed to cool again to milk heat ere the "yearnin" is put in to steep. The stomach is emptied of its contents, which being cleaned and mixed with a handful or two of salt, is put back again, and being likewise well rubbed outside, the full stomachs are then hung up to dry in the kitchen, and where they often hang for a year or more before using. It takes about one gill of rennet, more or less, according to its strength, to properly thicken the day's milk of about 20 cows.

The breaking of the thickened fluid comes next in course. This is effected, generally, by passing the arm and outspread palm, softly and steadily, in all directions through the coagulated milk. After a short time allowed for the curd to subside—most assisting by pressing it gently down with their palms—the whey is lifted off with a suitable vessel, and poured through a sieve into some receptacle for the use of the pigs. The massed curd left in the "boyen" is then cut into about 4-inch cubes, which are tied into a wet coarse cloth, spread within a square wooden box with perforated bottom and sides (termed a "dreeper" or "drainer"), and subjected to a pressure of about 30 lbs. or so. The curd undergoes this process four to six times (varying at different dairies), with lengthening intervals between, and each succeeding time being cut into still smaller pieces, with increased pressure, till the whey has been as completely expressed as the "dreeper" is capable of. In some dairies still the broad lump of solid curd is now minced fine with a peculiar S-shaped long-handled knife; but in the better-conducted dairies, for many years back, the lump is first cut into 4-inch cubes or so, and which are then put through the "curd-mill." The mills were furnished at first with sharp knife-teeth, but the cylinders are now fitted with eighth-part rectangular pegs (galvanized) which *tear* the curd into fragments. The breaking thus of the curd is considered an improvement, not only in being more expedite and less tiresome than the old-fashioned S-mincer, but the *fracturing* every bit undergoes, leaves the ground curd in a ragged state, forming more perfect cohesion afterwards, and any remaining *serum* coming more readily away. Due allowance of salt having been intermixed, a fit-sized "Chessat" (abbreviation for "Cheese-vat") is selected, and a cheese-cloth being spread within it, the prepared curd is firmly pressed in with the hand; the corners of the cloth being brought up over all, and the contained curd, it may be, jutting some three to four inches above the edge of the chessat. By this time it is rather past noon of the day. Some then place the chessat in front of the kitchen fire, with the lid weighted, and standing there for most of the afternoon, frequently turned so as to equalize the heat, and at evening it is put into the cheese-press. Others warm the prepared curd in a vessel before the fire prior to making up the cheese. During the process of pressing, too, the chessat is occasionally brought to the kitchen fire, an operation inconvenient and annoying, as well as laboursome for young women. To obviate these, Mr Andrew Calderwood, of High Borland, Craigie, had a "hot plate" fitted-up in his boiler-house or making-room, for warming the curd, &c. The plate is of $\frac{5}{8}$ inch cast-iron, about four feet by two, grooved on top for the whey to run off by, and laid flat on the top of a brick flue fired from the end, in line and on a level with the boiler. Several have since adopted Mr. Calderwood's plan. A certain degree of heat, tending to improve the quality as well as facilitate the pressing, must be kept up within the curd whilst becoming solid.

The kind of salt in general use is "Saltcoats-marine." When the cows are receiving turnips, most add about half-a-tea-spoonful of saltpetre along with the salt, or else (dissolved) into the milk before thickening, and which tends to counteract the turnip flavour. The proportion of salt to the varying weight of curd is off or on as 1 to 48. Aiton says 13 oz. salt to 24 lbs. curd, but he must either have made a mistake, or the makers have greatly changed since 1810. The reporter is not aware of any using above 1 lb. to a two-stone cheese, and most do not salt so heavily. The Cheddar people use still less salt; for instance, Mrs. Lindsay, of Townend, Craigie, one of our best Cheddar makers, salting at the rate of only 1 lb. to 64 lbs. curd. Many of the Dunlop makers salt partially during the "dreeping" process, again adding salt ere putting into a cheese shape, and some of the salt being dissolved at the former stage and coming off with the expressed whey, more weight has to be used when thus done at twice. The chessats are always of hard wood, composed of thick staves strongly iron-hooped, with heavy barred close-fitting lids, and stout perforated bottoms; and persons who have seen Ayrshire or Dunlop cheeses—who of any *gout* has not?—can tell as to the size and shape of the mould. The ratch-and-pinion-wheeled, iron-framed, lever presses, have been in general use over Ayrshire for the past 40 years at least; and many are now providing themselves with new presses on a combined screw-and-lever principle. The "double screw cheese-press," made by Messrs. J. and A. Taylor of Ayr, at a cost of £4, 15s., seems to act most efficiently, and is noted for its simplicity, durability, and easiness of labour to those working it. With it any pressure from 7 cwt. to 21 cwt. can be put on as desired.

About 5 o'clock P.M., the cows are brought back to the byre to be milked; the produce being carried to the milk-room, and poured about 3 inches deep—much shallower of course in butter-making dairies—into wide flat-bottomed vessels, in some cases of earthenware or glass even, oftener of tin or zinc, but still more commonly yet of wood, and where it rests till used next morning as afore-mentioned. Soon as milked the cows are again put on one of the nearest grass-fields till the evening is well gloamed, when they are brought in for the night. The *complete milking* of the cows is a very important matter. If the whole from carelessness is not entirely drawn off, the cow gradually declines in her milk and becomes much sooner dry. The last milk drawn besides is about ten times richer in cream than that which comes away at first; and a serious loss indeed is inflicted by careless or incomplete milking. In winter-time the cows are generally driven out to the watering-place, for an hour or so in the middle of the day when the byre is "mucked," and which is much healthier for them than carrying water into the byre.

The made-up cheese we put to press towards evening, is taken out of the chessat on morning of second day, and is then, in very many dairies though not by all, scalded with the cloth on for near an hour in hot water, fully as hot as can be tholed with the hand. It is wiped when taken from the hot bath, wrapt in a dry cloth, and put to press again. It is removed and dry cloths substituted at noon and evening of same day, reversing the cheese in chessat at each remove. Like performance has to be gone through, it may be only once in some dairies, perhaps twice in others, and even three times occasionally, on the third day, by which time the cheese is perfected. The dairy woman has thus always three cheeses in hand. The cheese is then placed without more ado wherever it is to lie till sold and sent off; being reversed and rubbed with a dry cloth every day for a short time at first, and afterwards at lengthening intervals. None of their inward colouring with annatto, or outside painting with Spanish brown; nor sweating, nor greasing, nor canvass-swaddling, at all; just the naked unadulterated truth.

The cases are so very rare in Ayrshire, where the stock is numerous enough as that a cheese can be made from each meal, that it is hardly worth while noticing them; the manufacture is the same in principle. Some few dairies here and there, but very limited in number,—amongst the best being those of Mr. Hugh Hunter, Barassie, Troon; and Mr. John Lambie, Hill, Crosshands,—are devoted to the making of small cheeses, from 10 to 12 lbs. weight each, and somewhat erroneously styled "imitation Stilton." These are commonly made on the Dunlop method, always "full-milk" or even more some times, and coloured with annatto; but it is questionable if the higher price they fetch, from 6s. to 8s. per cwt. extra, does more than compensate for the greater trouble and labour had with them.

Although we shall have occasion to insert the names of a few amongst the leading Cheddar makers, it would simply be acting invidiously on the reporter's part, were he to attempt any such selection in the vastly more numerous class of Dunlop makers.

Messrs. James Drennan, Holmston, Ayr, and David Cuninghame, Chapelton, Ardrossan, were deputed in 1854 by the "Ayrshire Agricultural Association," to visit and inspect various of the best dairy districts in England, and afterwards to report to the Association, which of the English modes in their opinion was the best adapted for introduction into this county,—granting, of course, if a better method could be found than the old Ayrshire or "Dunlop." The deputation decided on the "Cheddar system" of Somersetshire as being the best. The credit of initiating this movement for bettering the cheese manufacture of Ayrshire is due chiefly to the late Mr. Campbell of Craigie; a gentleman than whom no one in the county took greater interest in agricultural affairs, nor were there many so well qualified to lead from scientific combined with practical knowledge. Since 1855 several teachers of the new mode from Somersetshire have been brought north to Ayrshire, whilst some of the more zealous of our farmers' wives and daughters have themselves gone south to learn the system at the fountain-head. And upon the whole the Cheddar system has made considerable progress in Ayrshire, and more still in the larger dairies of Galloway. It has been fostered with high prizes at the annual exhibition of cheese in Kilmarnock, and there is the strong inducement held out to skilful makers, from *really good first-class* "Cheddars" realising in the London market about 15s. per cwt. more than can be got for the best quality of "Dunlops" at home. The London price, however, is subject to deduction for carriage, insurance, commission, &c.; and there is greater risk also, of course, of getting always prompt return of cash. Experience has shewn that as good quality of cheese—of that particular kind known in southern markets as the "Cheddar make"—*can* be made in Ayrshire, as in the somewhat milder latitudes of the south-west of England; and if such manufacturers, as, for example:—Mr. Thomas Lindsay, Townend, Craigie; Mr. James Cooper, Whitehill, Dailly; Mr. Andrew Allan, Munnock, Dalry; Mr. Alex. Young, Yonderton, W. Kilbride; Mr. William Bone, Auchencloigh, Sorn; Mr. James Pollock, Raws, Kilmarnock; Mr. Robert Drummond, Pocknave, Craigie; Mr. David Gibson, Collennan, Dundonald; Mr. John Rankine of Beoch, Lochlands, Maybole; Mr. Hugh Nairn, South Kilbride, Stewarton; Mr. Alexander Blane, Alton-Albany, Barr; Mr. Ivie Campbell, Dalgig, New Cumnock; &c., can turn out first-class Cheddar, or have it done for them under their or their wives' superintendence; a proportion of the makers, at least, might easily do the same, if they only bestow equal attention and care, coupled with a determination to excel, on the manufacture and storage of their cheeses. Although natural causes of climate and the kind of food (or, nature of soil, rather) &c., do affect the quality of cheese somewhat, yet such effects are but slight when contrasted with the differences of quality resulting from good or bad management in the manufacture, and in the after keeping of "the kane." But unless the tenant be provided with all fit accommodation, in the keeping of the milk, in manufacturing, in the storing and ripening of the product, and makes up his mind as well to turn out a *really good* article, he would be better to hold on by the old method. It is only *first class* quality of Cheddar that will pay to send to the London market, and Cheddars of even good quality, about the middle of the season, do not fetch above 5s. per cwt. more in the Scotch markets,—the Glasgow market, indeed, for two or three years by-gone has been glutted with inferior quality of (so called) Cheddar, bringing only equal price (or less, sometimes) with the average of Dunlop make; whilst about the New-Year and after, good old Dunlop have always as yet sold as high in Glasgow as even the best make of Cheddar of like age. And although the Dunlops rate lower during the season, a part of the loss (if not all) is made up by greater weight, as the Cheddars *dry in* and ripen much quicker.

The Dunlop makers are some times twitted with their "rule-of-thumb" method, as the Cheddar folks call it; but were not both Mr. Harding and Mr. Norton (Somersetshire teachers) of opinion that Scotch cheese makers followed "rules" too much, or rather that they made these rules too inflexible. Well, then, "rule-of-thumb"—that is, attention, skill or tact, and practice—is precisely what is wanted. Tastes for cheese differ, and the variety of manufacture which prevails in Ayrshire amongst the Dunlop makers, is rather advantageous than otherwise to the farmer, as well as to the consumer; and Scotch consumers' tastes will not be so easily changed as some of the "new lights" would appear to imagine. If the makers following the Cheddar system ever should reach an equality in numbers with those continuing by the old Dunlop mode, the writer does not hesitate to aver, that, good average Dunlops will then fetch from 3s. to 5s. per cwt. more in the Scotch markets than the same quality of its kind of Cheddar make; and Glasgow market will always be the mainstay of Ayrshire dairy farmers. Yet the agitation on the subject has been of great good by exciting the Dunlop makers to greater carefulness, and many have been altering their auld use and wont practice more or less, particularly in respect to thickening at a lower temperature. With more heed given to proper storage and ripening, ere long a much better average quality of Dunlop may be reasonably looked for.

The first difference between the two systems to be noted is, that the rennet is put into the milk by the Cheddar makers at a rather lower temperature—viz., about 80°, fully warmer during cold weather, and a degree or two less in very hot weather. The time allowed for coagulation is increased by the Cheddar makers to about an hour, using generally less rennet, and giving the milk longer time to thicken. By thickening at a lower temperature, the less butteraceous matter of course goes off with the whey, and by so much consequently is the cheese richer in quality. The difference of coagulating temperature, however, is so light, that any small weight of fat thus retained by the Cheddar makers, may truly be called infinitesimal; and some of the Dunlop makers are now thickening also at about 80°. But even allowing that the Dunlop makers should thus lose a few shillings in the price or weight of their cheese, it is all made up to them again in the extra fattening quality of the whey for pigs, and it is a question whether rearing pork at 11s. 6d. to 12s. per 24 lbs., especially by dairy farmers who cannot otherwise dispose of their whey, is not as remunerative or more so as cheese-making itself.

There is no difference in principle between the two methods in breaking up the coagulated milk. It is simply machinery *v.* manual expertness. What is called the "revolving-breaker," as introduced by Mr. Joseph Harding, is used most generally in Cheddar dairies. Mr. Norton, however, who was teaching lately at Dalgig and Oldmill, on the Marquis of Bute's estate, considers such violent stirring and breaking, as caused by the "revolver," injurious, and apt to start the white whey. The "revolver," indeed, appears an agent very unsuitable in the hands of servant-girls, very ignorant about machinery of any kind, and only too apt to be careless occasionally. By driving the "revolver" the least thing too fast at first, more fatty matter is sent off in white whey by much than likely to be gained by thickening at the lower temperature. Norton breaks up very gently and slowly with the hand and arm, or any other instrument as suitable, precisely in like manner as done in most Dunlop dairies. The "circular riddle-breaker" is used by some, having meshes of ¾-th inch size, with a long shaft attached vertically, and being *slowly* thrust and lifted up and down, through the mass, after that has been cut across in several places with a long thin knife.

The milk tub wrought with by Cheddar makers is made of tin, and which is a great improvement over the "wood boyens" in general use by Dunlop makers. The tin tubs are much easier kept clean and fresh, as milk adheres more to wood, and soon becomes soured, and the wood acquiring an offensive rotten smell, injurious of course to the flavour of the warm milk, if not very frequently scrubbed with hot water. The Cheddar tin tub is made with a *convex* bottom, which facilitates the separation of the whey, and having a spigot soldered in by which the under-whey is run off,—a wire strainer being placed across the vent inside, to stop small pieces of curd from escaping. Consumers who prefer the Cheddar-make must ascribe much of its superiority in quality,—either real or *fancied*, to the superior implements and vessels used by the Cheddar makers, along with the superlative accommodation for manufacturing and storing, now generally prevailing in Cheddar dairies, and in most cases recently fitted up; for we suspect, that were some of our more careful Dunlop makers to send out their cheeses of the same size, shape, and colour, as Cheddars, it would take a precious good judge to tell which was which! All of our Cheddar makers belong to the class of larger dairy farmers, and are yet more or less new fangled with their system, giving much more heed to the manufacture, &c., than previously they did under the old mode, and constant vigilance in details, doing everything at the proper nick of time, is a sure cause of success in any art or manufacture whatever.

The next and main peculiarity in the Cheddar system is that part of the process technically termed "slip-scalding." This practice though called a "recent improvement"—*vide* Harding's prize essay to the "Royal Agricultural Society"—is nothing of the sort, as it has been in existence in England for 60 years or more, and in Italy for much longer. Nothing similar obtains in the Dunlop mode, if we except the custom of *hot bathing* the newly made-up cheese on its first remove, and the raising of the ground curd to a high heat ere putting to press. The end desired is to get the whey thoroughly expelled, and to effect that, heat must be used; and the theory is, that too much heat at the time of thickening dissipates the fat, but a much higher degree applied after coagulation does not.

The curd being allowed an hour to form,—more or less as necessary according to weather, &c.,—is broken up with the "revolver" by *Joseph's disciples*, or otherwise by the *Nortonites*, and after standing a short time to subside, as much of the top-whey is lifted off and heated in the boiler to as high a temperature as will raise the whole contents of the tub to an uniform warmth of 100° when again poured back—the whole mass being constantly stirred until the required heat is attained, and the curd separating into small lumps like beans. The curd is then suffered to calm down and settle at the bottom, and afterwards the larger quantity of the whey is lifted off the top with a vessel, and the remainder run out at the spigot. The whey thus drained off, the curd is cut from round the sides of the tub, and carefully piled in square pieces on the raised centre of the bottom, where it rests for an hour or so with no pressure other than its own weight,—the whey meanwhile oozing off towards the sides and passing out at the vent. The curd is again cut into squares, which are reversed and piled as before on the centre, and after dripping for another half-hour or so, it is ready to be broken by the mill. In some dairies before putting through the mill, the curd is placed in vats and moderately pressed for about half-an-hour.

Mr. Norton and some others in Ayrshire prior to his time, differ somewhat in their "slip-scalding" practice from that given above. With them a quantity of the whey is first drawn off and heated, and as much poured back as will raise the whole contents to about that heat at which the milk was thickened or fully higher—viz., from 80° to 85°; continually stirring for at least a quarter of an hour, or some days longer, till the curd is thoroughly separated. Half-an-hour or so being elapsed, whey is a second time drawn off and heated, and the curd again scalded, this time to about 100°; and another half-hour spent and the curd sunk, the whole whey is then drawn off and the process gone on with as already stated. Norton's followers, however, seldom scald so high as 100°; raising the temperature of the mass according to the kind of land on which the cows may be grazing and the season of the year—that is, on light sands they scald to a less heat, and on heavy clay soils to 96° or fully. No fixed rules as to *exact* degrees of temperature, for every day and for every farm, can be laid down: practice and close observation must decide. Norton was also careful never to raise the temperature of the whey *for scalding* with higher than 120°, rather using a greater measure of whey, as he considered that the flavour of the cheese was apt to be hurt somewhat if the scalding-whey was too hot. A small quantity of *sour whey* (about 3 to 100) is stirred in, but that is nothing new, as a like practice has always been followed by many Dunlop makers. It is thought better to add the sour whey whilst the curd is being scalded, although some put it in along with the rennet. The sour whey, or soured milk answers equally as well, will tend to shorten the texture of the cheese, we should suppose. The time that the square pieces must lie and *dreep* on the raised centre till sufficiently tough and sourish, and the duration of the "stirring" process whilst scalding, are determined only by skill and patience. On some days the curd will be ready for the mill in little more than an hour's time, and on others it may have to lie for two or three hours The general rule is, in warm weather the processes must be hastened, and in cold weather the contrary. Cheddar makers in fact are obliged to go by "rule-of-thumb" just as much as the Dunlop makers, caused by differences of soil and pastures, of the rennet, of the milk, and of the atmosphere or weather. Cheese-making is an art only to be thoroughly learned—and thoroughly only in some few instances—by a long apprenticeship served to it. The writer was brought up on a cheese-making dairy-farm, and has all his lifetime been going out and in about dairies, but although he has thus a pretty fair knowledge of all the details connected with the various processes, he does not imagine for a moment that he could make and turn out (regularly) first-class cheeses, or probably even good second-class. It is one thing to know the theory and details of manufacture, but quite another thing to put these into practice. Few of our farmers themselves could undertake the manufacture by their own hands with much hope of success. It is the women who are the practical cheesemakers.

The curd being broken down by the mill, is mixed with salt in the proportion of about 1 to 56, and when made up into the cheese-vat, is put to press at once, usually between 2 and 3 o'clock P.M. Some change the cheese late on the evening of first day as well, but in general it is not removed till morning of second day, treated to a dry cloth, reversed in chessat, and put under pressure again. On the morning of the third day it is similarly removed and treated. And on the morning of the fourth day it is taken out finished, and shelved in the cheese-room, thus occupying three full days in all. Ere placing the cheeses they are bound round with pieces of strong canvass, or other material, as such deep unwieldy lumps as the Cheddars, would quickly bulge out on the sides from their own topweight if not so bound.

Generally the prepared curd is made up into a cheese shape at a temperature of between 60° and 70°; and in *very* warm weather it is often necessary to spread the ground curd on a cold leaden stand to lower the heat. The Cheddar makers mostly use *refined* Cheshire salt, although some of them still continue by the home-made "Saltcoats," and which, indeed, is highly famed far and wide for dairy purposes. The rennet used is similarly made as by the Dunlop makers. Several with whom the writer is acquainted, both Cheddar and Dunlop people, put in only as much "yearnin" to steep each night as serves for next morning; and they can thus depend on having the rennet always *sweet*, for rancid rennet must tend somewhat to hurt the quality of the product. A very small measure of *liquid annatto*—about ½ oz. to 100 gallons of milk, more or less in different dairies—is put in to improve (?) the colour of the Cheddars. Colouring is of any good only as a "trade-mark," but so long as coloured cheese sells better or is in demand—that is, so long as consumers trust as much to their eyes or more than to their mouths, so long, of course, will the practice be continued, and the small quantity of annatto requisite is perfectly innocuous. The large size of the Cheddars is disadvangeous in more ways than one.

The two systems have been already pretty well contrasted. The advantages, *if any*, got by following the new style of making, may be summed up in few words. The *simplicity* of the Cheddar manufacture as contrasted with other English modes, goes for nothing, as it is more intricate in details, if any thing, than our old Ayrshire way. The greater *uniformity of quality* obtained in each separate dairy by using the thermometer, may be an advantage, but which pertains equally to the Dunlop mode if the Dunlop makers would do the same. The use of the clock, so much insisted on, is in great part humbug, as the makers well know that the length of time allowed to each of the several processes varies more or less almost every day. The difficulty is on most of our small Ayrshire farms to get the dairy women to constantly attend to those minutiae, and many of them indeed know precious little about *degrees* of heat, although they can tell the proper warmth desired perfectly by the feel of their hands. The *lightness of labour*, also, said to be characteristic of the Cheddar system in England, does not shew itself much when contrasted with our Dunlop mode. The lifting and carrying and turning of such monsters of cheeses as the Cheddars, is alone no light labour for a woman of any age. The labour is every whit as great by the one mode as by the other; but in both cases, doubtless, the bodily fatigue may be lessened by special contrivances, implements, or appliances. Instance for the Cheddar mode Mr. Lindsay of Townend, who has fitted up a steam boiler at considerable expense, with pipes led from it through his making room and cheese lofts, chiefly for regulating the temperature of his storage rooms (kept always between 60° and 65°); but attached to the steam pipe in the making room is a long brass tube with a universal joint, and by plunging the nozzle of which into either milk or whey, these can be brought to any required heat in a few minutes, and thus saving much heavy lifting to the dairy maid. Any small amount of *weight* more obtained by either of the modes respectively over the other is so inappreciable, as that it may be said to be of no weight at all in the matter. The reporter inquired particularly as to this point at various of the Cheddar makers, and they one and all stated that they knew no perceptible difference in the weight of cheese obtained under their new mode. There cannot be, in fact, any more weight got worth notice.

With respect to the advantage of better quality, that is merely a matter of taste on the part of each consumer's palate. Because Somersetshire men maintain their cheese the best, it does not follow that Scotchmen are to swallow that belief in opposition to the decisions of their own palates. Cheshire men and Gloucestershire men equally hold up each their own make as respectively the best. London market prices do not settle the question of quality; for it Glasgow was London, and London Glasgow, very probably Ayrshire cheese would fetch the highest price in the kingdom! So far as the writer himself is concerned, he much prefers a slice of mild, unctuous, rather waxy Dunlop cheese, to the comparatively hard or woody, short often, dry Cheddar. Whoever first devised "slip scalding," his main object in view doubtless was to make the curd easier to press, or the cheese easier *staned,* as popularly said in Ayrshire; but the *scalding* of the *soft pulpy curd,* especially if the scalding whey is raised to 150° or 160° as many do, does give the cheese afterwards a sort of burnt flavour; and the writer thinks also, that, such a high heat must tend to dissolve and separate some of the fatty ingredient from the soft curd. The curd is far more dry and solid when highly-heated by "hot-bathing," or "warming" prior to putting into the chessat,—operations done with like purpose as "slip scalding,"—as by the Dunlop makers, and there is less danger by these of fat going off. In these days of chemical madness in relation to agricultural affairs, why don't some of the Cheddar makers manufacture one cheese each by the two modes respectively, both from milk of like strength, and have them analysed for the respective per centage of butyraceous ingredient. That is the proper test to decide the question of richness of quality.

Other things looked upon as about equal, it just amounts to this, that, if a good quality of Cheddar is produced, from 3s. to 5s. per cwt. more of price, during the season and in the meantime, can be expected at home,—but bearing in mind that the Cheddars ripen and dry in quicker, and consequently lose weight sooner; whilst if a really first-class quality is turned out, and the seller does not object to incur the risk and trouble consequent on sending to the London market, about 10s. per cwt. more may be hoped for there,—but again bearing in mind that, if really first-class quality of Dunlops, slightly coloured with annatto, was in like manner sent for sale to London, it would most probably realise some shillings more per cwt. there as well, particularly when its *name*—either as "Dunlop," or better simply as "Ayrshire cheese"—was once established. Finally—so far as the reporter can form an opinion, and which, of course, is only to be taken for what it is worth—the old Dunlop mode is yet the best for the large majority of makers in Ayrshire. Let them be more careful in details, and let them get improved implements if possible; and above all things let the landlords, as is their bounden duty in these hard times, provide roomier and better ventilated houses, furnished with all needful adjuncts, such as hot-plates, stoves, &c. It is only in dairies of about 30 cows and upwards, able to turn out, at least, one *large* cheese daily, in which there is much chance of producing first-class Cheddar cheeses; and that is where the Galloway farmers with their large stocks of from 60 to 70 cows have the advantage. The present apportioning of the money prizes at the Great Cheese Show in Kilmarnock, tends to foster cheese-making much more in Galloway than in Ayrshire. Give the Dunlops, at least, equal encouragement with the Cheddars. Independently of "paling" or not "paling" the cheeses to be shown, however, the richer and sweeter herbage—both of "sown young grasses," and of oldish pasture—grown on the warm kindly soils bordering the southern coasts of Galloway, is greatly in favour of the Gallovidean makers. Throughout very many of our Ayrshire pasture fields, those nasty and bitter tasted plants the crowfoots (*Ranunculi*—"buttercups") so much abound, that we should think it impossible to make either well-flavoured cheese or butter, by any mode or management whatever, from the milk of cows grazing thereon. The writer has had many opportunities for seeing, that, milch cows in Galloway are much higher house-fed than in Ayrshire, particularly in respect to meal and mangolds. As to the latter food, indeed, the Statistics prove that; for, Wigtownshire and Kirkcudbrightshire together, with only one-half the number of milch-cows, grow about 900 acres of Mangold as against the 1,100 acres in Ayrshire. Turnips and Vetches will throw a greater quantity of milk than Mangolds, but the milk from the latter is much richer in cream. Now, suppose a Gallow-man and an Ayrshire-man competing with each other, but that the former has the richest milk (more cream in it) by much to work upon, which of them is likely to win the day? They may talk of their "Cheddar flavour" or of any other flavour, but it is the *fat* chiefly (if not wholly) which gives the flavour. The main secret after all in the making of good and rich quality of cheese, whatever name you may call it by, is to put *all* the cream in!

This report has stretched out to such a length, that small room is left for any concluding remarks. But as almost every thing of any importance connected with the agriculture of Ayrshire, has been more or less incidentally touched upon in some one or other of the foregoing pages, little in truth remains to be said. Far more *horses* are kept in Ayrshire, and required, proportionally with the acreage of land under tillage, than in either Berwickshire or Haddingtonshire for instance. Monktonhill farm, on the coast, of 380 imp. acres in all, and about 230 acres under tillage annually, requires 5 pairs of regular work horses, and thus giving about 23 acres of tilled land to each horse. A farm of 175 acres, near Kilmarnock, all clayish loam, with the exception of about 25 acres light land, worked mostly on a 9-year rotation, and having about 80 acres annually under tillage, or rather less, requires 5 work horses, giving about 16 acres of tilled land to each. Another of 110 acres, mostly strong land, worked on a 10-year rotation, and having about 40 acres annually under tillage, keeps constantly 3 work horses, and thus giving only 13 acres to each. An inland farm of 80 acres wrought under the "Fairlie rotation," with consequently about 20 acres under tillage annually, cannot do with less than a pair of work horses, which of course gives only 10 acres of tilled land to each. On the class of farms last mentioned, indeed, the horses stand great part of their time idle in the stable, "eating their heads off;" although many of the small farmers find occasional employment for them in carting coals, wood, road-metal, &c. Excepting the few young ones reared, horses are seldom or never seen grazing on the fields during summer. As a whole, the work horses are of an excellent kind, strong and active; although, probably, Ayrshire is still somewhat behind her neighbours on the north and north-east—the head-quarters of the Clydesdale breed—in respect of first-class studs. Rearing of horses for sale is now followed by only a very few, chiefly in Beith and Kilbirnie districts, although very many still bring up a foal occasionally to renew their stock. In the tract of country lying to the south-east of Ayrshire, from Dumfries westwards by Castle-Douglas, Kircudbright, &c., rearing of horses as a branch of farm business is made much more of, and these are mostly bought up by Glasgow and Ayrshire "coupers," who again expose them for sale at the various west country fairs, and some of them doubtless finding their way ultimately to the east coast. A weekly *market* for the sale of fat cattle and sheep, as well as for Ayrshire stock generally, and also sales by auction in "auction marts," are held every Tuesday throughout the year at Ayr; but most of the feeders either dispose of their fat stock privately, or else by public auction at their homesteads, on a fixed day duly advertised. Sample *grain-markets* are held in the Corn Exchange at Ayr every Tuesday, and in the Corn Exchange at Kilmarnock every Friday, besides smaller sample markets, but regularly weekly, on other days of the week, at Girvan, Irvine, and Saltcoats. There are no fewer than 73 regularly recurring annual *fairs* throughout the year, for general business, and the sale of Ayrshire cattle of all ages, horses, sheep, pigs, &c., distributed amongst 27 of the various Ayrshire towns and villages. The principal of these for Ayrshire cattle are frequently attended by purchasers from England and Ireland, and occasionally also from America and the Continent. Some of them are also "feeing fairs" for men and women servants. *Farm-servants* of all classes are paid their wages mostly entirely in money, and more so of late years, and rather less in amount generally at present than some 10 to 15 years back. Steady married ploughmen receive about £21 per annum, free cottage with a "kail-yard" attached generally, about 5 loads of oatmeal, and one or two other small perquisites. Good unmarried ploughmen receive from £17 to £18 per year, with bed and board. Many of the larger farmers in the Kilmarnock district are now paying their ploughmen, married and unmarried, simply at the rate of 12s. per week throughout the year, and 20s. as a harvest present. Extra men hands as needed are fee'd for the *hairst*, at wages of from 14s. to 15s. per week with bed and board. Women days-wagers, for ordinary farm work and for hay time and harvest, are plentiful, receiving for the former from 10d. to 1s per day, and during the latter seasons from 20d. to 2s., without victuals. Dairy women, to take full charge, from £11 to £13 yearly, with board; second-class and assistant girls from £6 to £10 or so, according to age and qualifications.

Immorality, as shewn by *illegitimate children*, has no connection with the science or business of farming Country servants in that respect are no worse—probably not so bad, if the whole truth was got at—than their compeers or other folks in towns. The greater or less proportion of illegitimates arises, neither from kitchens, nor cottages, nor bothies, but from the good or bad state of morals prevailing. The per centage of illegitimacy in Ayrshire is 1 per. cent. under the average for Scotland—viz., 9 0 (of which the larger proportion must be placed to the manufacturing and mining population), whilst the neighbouring shire of Wigtown—with neither manufactures nor mines—has the highest per centage in Scotland—viz. 19 0; and yet the kitchen and cottage systems of housing and boarding male and female country servants prevails in both counties exactly alike—with this difference, that the masters and mistresses in Ayrshire look sharper after the outgoings and incomings of their young men and maidens, and associate more with them, setting them good example as well as frequently giving them good advice; whereas, in Galloway, from the higher style of living adopted by the larger class of farmers there, the masters and mistresses seldom see their servants out of or after work-hours—far less associate with them, and the latter being thus very much left to the freedom of their own wills, and no lack of opportunity, the consequences in due time appear in the 19 per cent. as above! A healthy religious element has for long existed within the class of small farmers, and of farm servants generally, in Ayrshire, and long may it continue.

With regard to the *Law of Hypothec*, as to which Ayrshire has become so notorious of late, it seems to the writer that the total or partial abrogation of that law would affect our farmers very little, if any at all. The rise in rents, however, cannot be much laid to the law of hypothec, but is due almost entirely to strong competition amongst the farmers for more land, often more than they have funds properly to manage, either for themselves or their sons, and to a pretty numerous class always cropping-out amongst the "bowers" and upper farm-servants, ambitious of possessing small farms. Such desire on the part of these is commendable enough. To talk of them being "men of straw" is simply incorrect. Men of straw! Honest and independent men they are, of the true Burns stamp: men of bone and muscle, and practical knowledge, as much required on the small farms as great amount of lying capital. What great capital does it take to enter into a clay farm of from 80 to 100 acres, with only some 20 acres of it in all under the plough? Although the milch cows may be rather few the first year, the grass is all that the more productive of milk, and the cows soon multiply and replenish. Farms taken between 1850 and 1860 are doubtless too high-rented,—much higher comparatively in Ayrshire than in other western shires, and by much too high for profitable investment in tillage-farming, or even in grass-farming, unless seasons become greatly warmer,—but who is to blame?—just the farmers themselves, both larger and smaller; and rents will soon again adjust to their proper level, for these few years back have damped the rage for land very considerably Some of the landlords, to their credit be it said, were not very exacting during the late cycle of bad years, Eglinton and Ballochmyle returning 10 per cent. of the rent once or twice, whilst Auchinleck and Sorncastle gave 10 per cent. of a drawback in lime. From a pretty long experience of both, the writer would as much credit the smaller inland farmers of Ayrshire with goods, as the more extensive ones nearer the sea; but, the former indeed, as a class, neither want nor ask for credit, as what few seeds, manures, implements, &c., they require, are generally paid cash. Talk of the effect of repealing the law of hypothec being to drive these from their farms! Nonsense. They can hardly be more fore-rented than they are presently. Getting possession of the ploughable land about or after Martinmas, and entering fully to the houses and grass at Whitsunday, they pay their first half-year's rent at Martinmas following, which is as much as they have yet drawn from the cows, and the small amount of grain-crop they cannot—without loss both on grain and fodder—thrash out at once. Although the law was made null to-morrow, that would not alter the case in Ayrshire with regard to fore-rents or back-rents in the slightest, we believe. If our landlords did think of such a thing as asking rent immediately on entry, or even prior to at least a half-year's rent being drawn from the soil, they would find the utmost difficulty in getting their lands let at all, or if let on such terms, it would only be probably at not more than some one-half the present rents received. The very supposition of such a thing is a sort of insult to the farmers of Scotland generally. What would a seedsman say, if, having taken a seed-loft for one or more years, the landlord should demand half-a-year's rent in hand ere giving up the key? Go to—would say the seedsman, and turn on his heel at once.

Any capitalist who would take 4 or 5 adjoining small inland farms (say 500 acres in all), at anything near a rent equal to the average of those presently paid by the 4 or 5 individual small farmers, the writer would at once mark as a fit candidate for the honour of placing "M.P. for Gartnavel" behind his name; and he would strongly advise any retiring Bailie-Nicol-Jarvie of Glasgow, who, with no experience of farming, fondly hopes to spend his declining years in "the delightful, gentlemanly, and sure wealth-producing practice of agriculture!"—as Cicero has it, by no means to try it on Ayrshire clays under Ayrshire climate. Whether the law of hypothec is totally annulled or only modified, it would only be justice to the merchant that they should have the power of knowing when sequestration is taken out against a farmer, and that landlords should have no power whatever to follow a *bona-fide* purchase. Failures as a rule have been amongst our larger class of farmers, but any money lost through these is infinitesimal in amount contrasted with the sums sunk in commercial bankruptcies, and failures amongst our farming class, indeed, are of comparatively unfrequent occurrence.

Farms without exception in Ayrshire are always let on leases of from 18 to 21 years in duration, mostly either 18 or 19. The rent of arable land ranges from about 10s. per imperial acre, up to near £5 in a few cases of crack shore farms. It would only be a very rough guess to attempt giving the average rent for the county; suffice it to say, that, taking into consideration the quality of soil and climate, we verily believe land is higher rented comparatively in Ayrshire than in any other part of the three kingdoms. Seriously speaking Ayrshire farmers generally have had a sore time of it of late, and most of them been very hard pressed for the wherewithal. However, the reporter sincerely hopes there are many better years in store and close at hand for his Ayrshire friends; and in concluding this report, he does so with the most hearty wishes of success to all.

"Good luck to the hoof and the horn;
Good luck to the flock and the fleece;
Good luck to the growers of corn;
May they ever have plenty and peace."

APPENDIX

THE Committee appointed by the General Meeting of the Ayrshire Agricultural Association of 17th May 1853, "to fix the points in Ayrshire Cattle which shall be held of most importance as indicating superior quality," after careful inquiry and consideration, report the following as the points which should, in their opinion, be attended to .—

HEAD short, forehead wide, nose fine between the muzzle and eyes, muzzle moderately large, eyes full and lively; horns wide set on, inclining upwards, and curving slightly inwards

NECK long and straight from the head to the top of the shoulder; free from loose skin of the under side, fine at its junction with the head, and the muscles symmetrically enlarging towards the shoulders.

SHOULDERS thin at the top, brisket light, the whole fore-quarters thin in front, and gradually increasing in depth and width backwards.

BACK short and straight, spine well defined, especially at shoulders; the short ribs arched, the body deep at the flanks, and the milk-veins well developed.

PELVIS long, broad, and straight, hook bones *(ilium)* wide apart, and not much overlaid with fat, thighs deep and broad; tail long and slender, and set on level with the back

MILK-VESSEL capacious, and extending well forward, hinder-part broad, and firmly attached to the body, the sole or under surface nearly level. The teats from two to two and a half inches in length, equal in thickness, and hanging perpendicularly, their distance apart at the sides should be equal to about one third of the length of the vessel; and across to about one-half of the breadth

LEGS short, the bones fine, and the joints firm

SKIN soft and elastic, and covered with soft, close, woolly hair.

THE COLOURS preferred are brown; or brown and white, the colours being distinctly defined

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REPORT OF IMPROVEMENTS ON THE ESTATES OF MURKLE AND DOUNREAY, IN THE COUNTY OF CAITHNESS.

By WILLIAM R TAIT, C E, Factor, Oldfield, Thurso.

Premium—The Gold Medal

THE estate of Murkle, containing 2216 imperial acres, lies in the parishes of Thurso and Olrig. Its northern boundary is Dunnet Bay, and the bluff headland of Dunnet (the most northerly point of the mainland of Scotland) is its only shelter from the piercing winds of the north-east. The soil is a clayey loam, resting on the Caithness flagstone. The flagstone lies,on the average, within three feet of the surface. The crops principally grown are turnips, oats, and grass.

The estate of Dounreay, containing 16,464 imperial acres, lies in the parish of Reay, about six miles to the west of Thurso. Its northern boundary for about six miles is the precipitous coast line of the Atlantic Ocean, and the furious winds of the north-west carry the sea spray for miles inland. The soil is a clayey loam (but not so strong as that of Murkle), resting on the flagstone, which is uniformly nearer the surface than at Murkle. The crops grown are turnips, oats, bere, and grass.

The leases of both estates expired at Whitsunday 1859. The whole of the estate of Murkle for the lease of nineteen years expiring at said term, was held by the late Captain Henderson of Stemster. The estate of Dounreay for the same period was occupied by Captain Macdonald, late of Sandside, and the late John Paterson, Esq. These were the three principal tenants holding from the proprietor; on the estate of Murkle there were fifty-four sub-tenants, and eighty-five on the estate of Dounreay.

Admiral Sir John Gordon Sinclair, Bart. (who died in 1863) was proprietor when the leases referred to expired. For some years previous to their expiration, he and his son, the present proprietor, Sir Robert Charles Sinclair, directed their attention to re-letting the estates under improving leases. John Mitchell, Esq. (now agent for the National Bank of Scotland, Dingwall), who is well known in Ross-shire and Morayshire as a skilful and successful agriculturist, and intimately acquainted with the management of landed property, was recommended by the Marquis of Tweeddale to Sir John to report upon the condition of the estates, and how they should be re-let. He visited them in 1856, three years before the old leases expired, and reported in favour of abolishing the system f sub-tenantry, and proposed an outlay by the proprietor of £14,200 upon buildings, fences, and roads. Upon outlays for drainage, the tenants to be charged the usual drainage rent charge of 6¼ per cent. The following abstract taken from his report shows a clear gain of £1127 12s. per annum.

	Present Rents.	Outlays.	Interest on Outlays at 6¼ per cent.	Future Rents.
Estate of Murkle, .	£832 4 0	£5,000	£325 0 0	£1510 0 0
Estate of Dounreay,	1355 4 0	9,200	598 0 0	2978 0 0
	£2187 8 0	14,200	923 0 0	4488 0 0
Rent for next lease, as above, . . .			...	£4488 0 0
Present rent, ...			£2187 8 0	...
Interest on outlays and incidents, . .			1173 0 0	...
Taken from the proposed rent, . . .			...	3360 8 0
Leaves a clear gain of			...	£1127 12 0

' The report concludes as follows:—"It is perhaps unnecessary to say that, should the views and suggestions submitted for the improvement of the estates be adopted nearly as they are, or even in a modified form, there will be many difficulties to encounter and overcome, in carrying out so great a change all at once, or even in the course of a few years, on an entire property of such an extent; but, so far as the reporter could judge of the quality and resources of the soil, and comparing them with what he saw in other parts of the county, he has confidence in saying that a qualified person with energy, resolution, and forethought, would undoubtedly realise the important result which has been indicated in the above abstract."

After searching inquiry and mature consideration, the proprietor was satisfied of the practicability of Mr. Mitchell's report, and decided upon re-letting his estates upon the terms recommended therein. The reporter was then employed to make a survey of the estates (in so far as the old plans were not found sufficient), and to prepare plans showing the proposed new farms, their contents, and the roads and fences. Conditions of let were prepared and printed, and were as follows:—

"1. The lands are to be let in accordance with the new arrangements of the farms as delineated on plans, and the boundaries of the respective farms will be pointed out on the ground to intending offerers.

"2. The leases are to be for nineteen years, and to contain clauses excluding assignees and sub-tenants, and of irritancy in case of bankruptcy, and other usual and necessary clauses.

"3. The entry to the houses and natural pasture on the lands not heretofore in cultivation, is to be at Whitsunday 1859, and to the arable lands, whether in cultivation or pasture, at Martinmas following. The fallow for green crop, one and two year old grass, and the old arable land in pasture on the holdings, may be given over by the present tenants at the term of Whitsunday; and, in that event, they are to be paid for by the incoming tenant at the valuation of neutral men mutually chosen. The straw is to be left by the present tenants in steelbow. The incoming tenant is to cut, lead, and perform other services to the waygoing crop, conform to use and wont.

"4. The exclusive right of hunting, shooting, and killing game, and the right of fishing in any streams or lochs on the property, are to be reserved to the proprietor and those authorised by him. Also, all mines and minerals, &c., are to be reserved to the proprietor, with power to search for and work and carry away the same, he paying surface damage only to the tenants. All moss, sea-ware, and shell-sand are likewise to be reserved to him for the general use of the lands within the bounds of his property, with the right of searching and carrying away the same on similar payment. The right to straighten marches, or to excamb with neighbouring proprietors, is to be reserved to the proprietor.

"5. The lands are to be let at a yearly annual rent in money, one-half thereof payable at the term of Martinmas, in the year during which the crop is reaped, and one-half thereof at the Whitsunday following.

"6. Offerers for the farms must state in their offers the extent of repairs or additions they may require for existing houses, and on new farms where houses are to be provided, the extent of accommodation required, and also the fences desired to be built. Arrangements will be made for supplying the accommodation and fences agreed on in each case, and the tenant is to perform all carriage required in connection therewith. Certain roads are to be made by the proprietor for the accommodation of the farms, and the tenants are also to perform all carriages in connection therewith, and all farm and service roads on the property are to be upheld by the tenants in good repair during their leases, and so left at the expiry thereof. Drainage money will be provided for such tenants as may not wish to drain at their own expense, on which money they are to pay the drainage rent charge along with, and under the same conditions, as the rent. All lands capable of being brought into profitable cultivation are to be improved by the tenant within the first seven years of the leases.

"7. All houses are to be insured by the proprietor, the tenant paying one-half of the premiums along with his rent for the year. All houses and fences built, repaired, or added to, or to be built, repaired, or added to during the lease, are to be kept in good condition and repair by the tenants during the currency of the leases, and so left at the expiry thereof.

"8. The tenant is to labour, cultivate, and manure the lands according to the rules of good husbandry, and to leave them in good order and condition at the end of the lease, and, in particular, not to have more than one-half of the arable land under white grain crop in any one year; and at the term of Whitsunday of removal from the houses and pasture, he is also to give over to the landlord or incoming tenant not less than one-sixth of the arable land in fallow for green crop once ploughed, not less than one-sixth in first year's grass, sown the previous year with the grain crop after turnips, and not less than one-sixth in second year's grass, also sown with grain crop after turnips, for which he shall be paid, as fallow and grass respectively, according to the valuation of neutral men mutually chosen. The landlord or incoming tenant to have liberty to sow grass seeds with the part of the waygoing crop which is after turnips, and which seeds are to be harrowed in by the waygoing tenant. The dung and straw are to be consumed on the farm, and what remains unconsumed at the said term of Whitsunday is to be left to the incoming tenant at valuation. The incoming tenant is to cut, harvest, stack, thrash, and cart to market the waygoing crop, for which services he is to receive the straw thereof."

The large farms were then advertised, but none of the farms under fifty acres were so.

Eligible offers were received for all the farms advertised, and they were let at rents which, on the whole, slightly exceeded the valuation. The remaining farms and lots were then let at the valuation to the sitting sub-tenants.

Some little time before Whitsunday 1859 (the commencement of the new leases), the reporter was asked to undertake the carrying out of the improvements arranged for with the tenants.

In Caithness there is an immense extent of improvable land, ranging in depth from 3 feet to 18 inches, which, when properly drained, bears remunerative crops. The great peculiarity of this land is, that very little of it requires trenching; not one acre of upwards of 2000 improved upon Sir Robert's estates within the last six years required to be trenched.

After the land is drained it is ready for ploughing, and if ploughed in autumn it is ready for an oat-crop the following spring; and with an application of 2½ or 3 cwt. of guano per acre, it yields from three to four quarters of oats per acre.

This is in striking contrast with the improvement of land at Ardross, in Ross-shire, where the average cost of trenching was £8 13s. per acre; that of blasting rock and boulders, £5 2s. per acre; and that of clearing the stones off the ground, £2 8s. 3d. per acre; the average cost of draining being £6 10s. 10d. per acre—making the total average cost per acre, £22 14s. 1d. After this the land was limed and heavily manured before cropping. The return of oats per acre was from five to six quarters.—See *Society's Transactions*, January 1858.

Drainage.—The reporter has executed about 500 miles of drains. The average depth of drains is about three feet—the sub-stratum being flagstone. The drains are cut down to the rock unless the soil exceeds four feet in depth, which in a few cases it does. Where the drains are not over two feet in depth, the tiles are laid in a groove cut out in the rock for them. When so placed, they are beyond the reach of damage from agricultural operations.

The minor drains are all laid with 1½ inch pipe tiles, and the leaders with 3 and 4 inch pipe tiles, according to circumstances. Collars are not used unless the land is very soft.

The distance between the drains must ever be regulated by the depth of drain, the porosity of the soil, and its wetness. From the reporter's experience, he considers 24 feet apart a fair average for drains ranging in depth from 2 to 3 feet. The average cost of draining land in Caithness with tiles, may be safely put down at £6 3s 4d. per imperial acre, exclusive of carriage of tiles. This is the outlay required to fit it for the plough.

Buildings—There have been 15 new farm steadings erected in connection with the improvements—two for farms of about 400 acres of arable land each, and the others for farms ranging in extent from 40 to 200 acres. There have been four new farm houses built at old steadings, the smallest at a cost of £250, and the largest £800, besides additions and repairs to the old farm steadings. The stables and byres are all open to the roof. The byres generally contain two rows of cattle, with a centre passage from which they are fed. The fittings consist entirely of flagstone. The flag divisions between the cattle measure 6 feet by 4 feet, and are from 2½ inches to 3 inches thick. The feeding troughs consist of pavement, and the floors are all paved. These fittings are the cheapest and most durable that can be used.

All the cottages erected by the proprietor at the farm steadings, are for married men, with the exception of a "bothy" at the Mains of Murkle. The cottages are substantially built, and comfortably finished, all the walls and ceilings being properly plastered. They are of two sizes. One size containing 2 rooms with presses, and outside accommodation; and the second size contains 4 apartments, 2 rooms on the ground floor, and 2 attics, with outside accommodation.

At the Mains of Murkle there is a "bothy" for young men. It contains 6 separate sleeping rooms, and one large common sitting room. It is situated between the cottages for married men, and in the immediate vicinity of the Grieve's house.

Fencing.—There have been 22 miles of dykes built, ranging in height from 3 to 5 feet, exclusive of coping, besides 11 miles of flag fences, and 8 miles of ditches on which flags have still to be set. Whins are generally sown along the sides of the flag fences. Flag fencing is peculiar to Caithness. The flags are generally obtained from the quarries worked for marketable pavement. They are coarse and uneven on the surface, but durable, and make a good fence for sheep. They are sold at a penny per lineal yard, each flag being not less than 4½ × 3 feet. The cost of erection ranges from 1s. 10d. to 2s. per chain. There is generally a ditch 5 feet wide, and 3 feet deep, cut alongside the flag fence at a cost of 4s. 6d. to 5s. per chain. The cost of ditch and flag fence may be put down at 8s. 4d. per chain exclusive of carriages.

Roads.—The extent of farm and service roads made is about 8 miles. A considerable quantity of the materials for the roads were got from the quarries worked for pavement and building stones.

The improvements are now nearly completed. All that has to be done, with a few exceptions, will bear interest at the rate of 5 or 6½ per cent., and, therefore, does not come within the range of the fixed amount for the improvements. The accounts are made up to Martinmas last, and the outstanding payments not yielding interest are so small that they cannot materially affect the final result.

The whole of the outlays for improvements executed by the proprietor are shown in the following statement:—

BUILDINGS.						
Estate of Dounreay, -	£6,620	11	6½			
Estate of Murkle, - -	2,968	8	11			
Miscellaneous, - -	61	8	5½			
				£9,650	8	11
DRAINAGE.						
Estate of Dounreay, -	£3,741	9	5¾			
Estate of Murkle, - -	2,771	3	4			
Tiles for Dounreay and Murkle,	2,672	19	5½			
				9,185	12	3¾
RING FENCES.						
Estate of Dounreay, -	£784	3	10½			
Estate of Murkle, - -	323	5	5½			
				1,107	9	4
INTERIOR FENCES.						
Estate of Dounreay, -	£414	7	9			
Estate of Murkle, - -	486	16	10½			
				901	4	7½
FARM MARCH FENCES.						
Estate of Dounreay, -	£396	8	9			
Estate of Murkle, - -	46	0	7			
				442	9	4
PROPERTY MARCH FENCES.						
Estate of Dounreay, - - - - - -				399	17	3
SERVICE ROADS.						
Estate of Dounreay, -	£308	13	0½			
Estate of Murkle, - -	177	12	10½			
				486	5	11
FARM ROADS.						
Estate of Dounreay, -				238	17	2¼
MISCELLANEOUS.						
Estates of Dounreay and Murkle, - - -				58	3	11
FLAG QUARRIES.						
Dounreay Quarries, -	£2,431	2	7½			
Murkle Quarries, - -	727	7	11½			
Pavement Manufactory, -	903	11	11½			
				4,062	2	6½
Total amount expended from Whitsunday, 1859 to Martinmas, 1864, - - -				£20,532	11	3¾

The above figures are taken from the reporter's accounts duly audited every half year.

From the sum of £26,532 11s. 3¾d. has to be taken the amount received for pavement, &c., and the value of the pavement in stock, amounting in all to £2,403 14s. 9d¼., which leaves as the true amount expended, £24,128 16s. 6½d.

The tenants pay an annual drainage rent charge of £400 17s. at 6½ per cent., and £236, 17s. at 5 per cent. These sums capitalised amount to £10,904, 17s. 3½d., which, taken from £24,128, 16s. 6½d., leaves £13,223, 19s. 2¾d. as the amount expended by the proprietor upon improvements not yielding interest. The item £399, 17s. 3d., under the head "Property march fences," was not included in the estimate of £14,200, and, therefore, falls to be taken from £13,223, 19s. 2¾d., leaving £12,824, 1s. 11¾d., which, taken from £14,200, shows a balance of £1,375, 18s. 0¼d, in favour of the improvements.

In the course of carrying out the improvements, flag quarries have been discovered on both estates. They are now in good working order, and will be a source of revenue.

Permanent Success of Improvements.—The fact of two thousand acres of waste land having been improved, within the last six years, is no mean security for the permanent success of the improvements. This improved land is now yielding excellent crops. In 1863 Mr. Brown of Upper Dounreay (one of the new farms), carried the cup for the best 10 acres of yellow turnips in the county. Eight of the best farms competed. The weight of Mr. Brown's crop per acre was 25 tons, 12 cwt., 3 qrs., 12 lb. The next highest was 23 tons, 1 cwt., 1 qr., 20 lb The turnips were grown on land lying in its natural state when the farms were let, and on which grouse were shot the year before it was broken up.

Mr. Brown competed last year for the cup, but was unsuccessful. Still he occupies an honourable position amongst the competitiors, as seen from the subjoined statement taken from the *Northern Ensign* of January 12, 1865.

Yellow Turnips.

	Weight per imperial acre			
	Tons.	Owt	Qrs	Lbs
Sir Geo Dunbar, Reiss Lodge, - - -	20	8	2	8
William Paterson, West Watten,	29	18	0	24
George Brown, Watten, - - - -	29	6	1	20
James Hay, Scrabster, No. 1, - - -	20	0	0	0
James Hay, Scrabster, No. 2, - - - -	21	0	0	0
George Trail, Esq., M P, Castlehill, -	24	6	3	4
James Purves, Lochend, - - - -	24	0	0	0
William Purves, Thurdistoft, - - - -	22	7	2	0
Robert Paterson, Ratter, - - - -	22	18	2	0
Robert Brown, Upper Dounreay, - -	28	14	1	24
Thomas Purves, Hoy, - - - -	25	15	2	24
Earl of Caithness, Philips' Mains, - -	25	17	2	0

Here, in competition with a dozen of the best farms in the county, Mr. Brown stands third. The crop is the second after reclamation from moor.

The present leases expire at Whitsunday, 1878, with the exception of Upper Dounreay, which does not expire until 1883.

Mr. Mitchell, in his report, calculated that the estates at the expiry of the present leases would let for £6,100. The reporter considers this a very moderate estimate of the enhanced value of the estates at that period.

The present rental, including interest payable by the tenants, is £5,084. The value of 2,500 acres (there will be fully this extent improved before the present leases expire) of improved land at Whitsunday 1878 will not be less than 15s. per acre., which amounts to £1,875, added to the present rental, makes £6,959. This appears to be the minimum rental that will be obtained at Whitsunday, 1878. In this estimate no account has been taken of the immense amount of carriages performed by the tenants in connection with the improvements, free of charge to the proprietor

The debt upon the property for improvements at Whitsunday, 1878, will not exceed £14,000; for it must be borne in mind, that the interest paid by the tenants during the currency of the existing leases is equal to the clearing off of about £10,000 of capital and interest.

General Remarks.—A question not unfrequently arises, as to whether improvements should be undertaken by the proprietor single-handed, or in conjunction with a good class of tenantry. In ordinary circumstances the wise and profitable course is to make liberal arrangements with good tenants, and when such arrangements are made, they are as a rule zealously and faithfully carried out, with benefit to themselves and their proprietor. Judging from a well paid rent roll, the improvements reported upon are not only satisfactory to the proprietor, but also to the tenantry who have been associated with him in their execution. And it gives the reporter much pleasure to be able to state that neither with tenant nor contractor has any misunderstanding arisen, during the six years the works have been in progress, but such as was amicably settled.

In concluding this report, attention may be directed to the drainage of the waste but highly improvable land in Caithness. The value of the greater proportion of such land may be put down at 2s. 6d. per acre, and the drainage rent charge payable by the tenant at 8s. per acre, making the rent 10s. 6d. per acre. In 25 years the principal and interest of the cost of draining may be cleared off. The land should then at the lowest estimate be worth 10s. 6d. per acre. It thus appears that such land increases four-fold in value in 25 years, without costing the proprietor more than a fractional amount of expense and trouble.

The reporter would suggest that a memorial from the landed proprietors of the county be presented to the Drainage Commissioners for England and Wales, setting forth the peculiar geological formation of the county, and the great capability of its soil for improvement, and crave a relaxation of their rule as to depth of drainage works. The minimum depth to be 18 inches, with the tile completely sunk in the rock at that depth. If this boon were granted, agriculture would take a fresh start, and thousands of acres now lying in an unproductive condition, would be brought to contribute to the wealth and prosperity of the county.

REPORT ON THE MANAGEMENT AND SALE OF TIMBER

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Premium—£10.

The statistics of Scotland give nearly 414,000 acres as the extent of ground under wood cultivation, being an area approaching to that annually under turnip crop. An inquiry by the Highland and Agricultural Society was therefore very naturally instituted as to the produce of the lands so employed, the purposes to which it is applied, and the pecuniary returns yielded to the proprietor. So far as the limits of this paper will admit, and reliable statements are possessed by the writer, he will endeavour to supply such information.

The increasing substitution of iron for wood in shipbuilding and other important works, has the effect of keeping down the price of the *best* quality of timber, though at the same time the demand is steady, if not considerably on the increase, for second-rate timber, required for general purposes. The price of timber, like that of other products of the soil, is subject to variation, occasioned by various causes. When mining operations receive an impetus at any time, the effect is an increased demand, and an upward tendency in the price. On the other hand, when a gale of wind occurs, as was the case on 3rd October, 1860, and on 13th February, 1864, the market becomes overstocked. So, also, when trade is affected, vessels take timber as a return freight, thus affording an extra supply of foreign wood, and depressing the market price for home growth.

In collecting special information upon the true value of wood as a crop, many difficulties are presented, amongst which we would especially notice two—viz.,

First, The inaccuracy, or rather the indefinite manner, of recording the various expenses incurred upon any individual plantation, from the time of planting to the time of cutting down the mature crop. Secondly, The great difference between the value of the same crop as recorded by different individuals, partly arising from the various systems of measuring, and partly on account of the various purposes to which it is to be applied. It must be borne in mind that much of the value of a crop of wood depends upon the system of selling it. A timber merchant can often afford to give from ten to twenty per cent., and even more, for a plantation, by purchasing the whole of it, than he could afford to give for it in small lots. On the other hand, it may happen, though rarely, that wood may be sold in too large lots to command due competition.

The writer's experience is, that proprietors in general ought not either to fell their own timber or manufacture it, as by so doing they lose considerably. An instance of this (amongst others of a similar kind) recently occurred under the writer's immediate superintendence. The work was of common occurrence—that of cutting down wood for paling, carting it to the saw-mill, sawing the paling, and again carting the latter from the saw-mill to the place for erecting the fence. When the various items of expense were added together, they amounted to a total considerably above what the timber merchant would have supplied it for; thus the value of the rough wood out of which this paling was cut was totally lost to the proprietor.

An instance in point may also be quoted of an extensive proprietor in Morayshire who for many years manufactured his own timber, and continued to do so till he was shown that, while his immense and valuable forests were fast disappearing, there was only a fraction of clear returns to himself—the whole value being absorbed in the manufacture of the wood. Since that time he has adopted a wiser and better plan, which is to dispose of the whole of his wood standing (except thinnings of young plantations) to timber merchants, and his returns have been enormously increased.

Another instance, even less favourable than the preceding, occurred a few years ago upon an estate in the county of Sussex, where a proprietor was in the practice of selling considerable quantities of larch timber in the growing state, for which he received 10d. per cubic foot, being the current market price. He became persuaded that he could make more of his timber by manufacturing it and supplying a contract for railway sleepers required on the London and Brighton Railway. The wood was all cut down, manufactured, and carried to the place of delivery (Godston Station) at day wages. On balancing accounts, the proprietor found to his dismay that not only was he minus the price of the wood (10d. per foot), but that he had been a loser to the amount of 3d. per sleeper.

Upon most estates of any considerable extent, it is the proprietor's interest to dispose of all surplus wood to timber merchants, either in the growing state or cut off the root, without further labour upon it, and to re-purchase the manufactured wood required for estate purposes. The benefits resulting from this system are that the proprietor is enabled to dispose of all his wood to greater advantage, good and bad together; whereas, exhausting by cutting and manufacturing for his own use the greater portion of his best timber, he is unable to dispose of the inferior class except at a great discount—the timber merchant not being able to afford a price for it, equal to its true value, in consequence of being obliged to market the one class of wood without the other. The theory is false that leads to the conclusion that, by the proprietor manufacturing his own wood, he thereby has to himself the timber merchant's profits, because not only does he require to discharge the various duties of the latter, including travelling, attending markets, making out estimates, keeping books, superintending the manufacture of the wood, &c., but he is also liable to losses in various ways, as wasting and spoiling of the wood.

Another instance of how proprietors often greatly lose by their woods is in the way of clearing the timber from the ground in difficult places, such as rocky glens, bogs, and soft mossy ground. The writer has often seen wood remain and rot upon the ground from want of skill or experience in clearing it, except at a cost beyond that of the value of the wood. The system most recommendable for clearing rocky glens is to cut the wood during winter or spring, and to snead, bark, and cross-cut the trees into suitable lengths, allowing it afterwards to lie upon the ground in a drying position till pretty light and ready for floating. In order to practise this system, it is assumed that a flow of water is in the glen of lesser or greater quantity. This water is dammed up at one or more convenient places, and, being provided with sluices, the water is allowed suddenly to escape and fill the channel into which the wood has been previously put; the rapid flow of water thus carries it to a convenient place for cartage or manufacture. By the floating system a saving of thousands of pounds is effected to some proprietors in the north of Scotland. Mosses, where there is no road metal, are difficult to clear. The best plan is to manufacture the wood by means of portable steam-engines, cutting it first at a place nearest of access, and using the rough slabs or backs in forming the road, stage by stage, further into the wood or forest, bedding and blinding the backs with sawdust. This makes a very good and serviceable road for carting upon, and may be made for £20 to £25 per mile. The writer has made several pieces of this description of road, which answer the end admirably, at the rate of £20 per mile (labour only). In manufacturing wood the writer's experience gives the preference to the portable steam-engine and light portable machinery, which in his estimation possess many advantages over fixed steam saw-mills and water-power. The scope of this paper, however, will not admit of pointing out the relative advantages.

Plantations are in some cases a very profitable investment, as in others they are the very reverse, either of which results depends almost entirely upon the skill bestowed upon their early culture and planting. Judiciously managed, they are quite as profitable as any other crop the ground produces, while injudiciously managed, they become a burden and a loss to the proprietor. In illustration the following instances are offered.

No. I. is a larch plantation in the county of Sussex grown as a crop of hop-poles, and sold by public auction in the month of November 1855, after having completed its fourteenth growth. The plantation comprised about eleven acres, and was divided into five lots, which were sold at prices varying from £60 to £70 per acre. Allowing £65 as the average price per acre, the following are the returns, after cutting and conveying to market when partially dried:—

1400 10-feet length hop-poles, at 20s. per 100, -	£14	0	0
1500 12-feet do. do. at 25s. per do.,	18	15	0
1000 14-feet do. do. at 28s. per do, -	14	0	0
2500 16-feet do. do. at 32s. per do, -	40	0	0
1600 18-feet do. do. at 40s. per do, -	32	0	0
	£118	15	0

Purchase money per acre, - - - - -	£65	0	0
Cutting and clearing the wood, - - - -	10	0	0
Carriage to market, - - - - - -	20	0	0
Wood merchant's profit, - - - - -	23	15	0
	£118	15	0

Against the above there is a sum of £21, 3s. to be charged for planting, keeping down weeds, and interest—thus leaving a clear profit of £43, 17s., which, divided by 14—the number of years' growth—gives £3, 2s. 7½d. per acre annual returns to the proprietor. Similar ground to that occupied by this plantation was rented at 25s. per acre. Balance in favour of planting, £1 17s. 7½d.

One-fourth of the trees either died early, or were too small for hop-poles when the crop was cut, and were converted into thatching rods which are used for keeping down the thatch upon houses, such as porters' lodges and summer-houses, or more generally for stacks in corn-yards. For the latter purpose, there is considerable demand in the vicinity of London. On the present occasion only a few bundles of such ware were procured, of which no account is taken.

No. II. is a larch plantation in the county of Sussex, planted originally with a view of producing a crop of hop-poles, being planted amongst sweet chesnut and ash, the latter sorts 4 feet apart, and made up with the former to 2 feet all over the ground. The site of the plantation being in view of the mansion, it was found desirable on clearing the crop of hop-poles, to leave as many larches upon the ground, as would preserve to it a furnished and clothed appearance, with a fair crop of coppice wood amongst them. This latter anticipation, however, was not realised at the usual period for cutting the second time, as scarcely any of the rods were size enough for hop-poles, while, at the end of the third period for cutting, 32 years from time of planting, the coppice wood was found to be only fit for, and was manufactured into hoops, broom handles, training rods, and similar ware.

In clearing the crop of hop-poles 12 years planted, the larch chosen to stand were the strongest, and best on the ground, and were left at distances varying from 25 to 30 feet apart, numbering on an average 60 trees per acre. At the end of 32 years' growth, the whole of the larches were cut down and cleared off the ground for the sake of the underwood, (which was considered at that time the most valuable crop), and because the trees had in many instances attained maturity.

The following are the average results per acre, the trees measured lying upon the ground after being cut and sneaded:—

60 trees, average 30 cubic feet, = 1800 feet, at 10d. per foot,	£75	0	0
The ground similar outside the fence was letting at 20s. per acre,	£32	0	0
Proportional expense of original planting,	0	10	0
Compound Interest at 4 per cent. on original outlay	1	5	1
	£33	15	1

The writer would remark that, this plantation having been originally planted with the object of producing a crop of hop-poles, no attention was paid to what subsequently constituted the timber crop. After the trees were selected to stand, it was not with a view to profit; otherwise, instead of 60 trees per acre, 100 trees per acre would have been left. By pursuing the latter system the value of the crop would have been more than one-third greater.

The trees were well clothed with branches, and contained from 25 to 35 cubic feet of timber. Larch trees of the same age, and in the same locality, planted upon similar ground, but either mixed with Scots pine, or in groups by themselves 6 to 7 feet apart, contained on an average 4 to 6 feet of timber, but were considerably decayed in the heart wood, thus evincing that not only are the branches of trees essential to produce timber, but also to prolong the healthy condition of the trees.

An instance of how far the branches of trees affect their growth and prolong their lives, may be seen in the larch trees about Dunkeld upon the property of the Duke of Athole, far famed for its larch timber—taking the two large ones near the abbey as the subjects of illustration. These two trees, well known to be amongst the first planted in Scotland, are deserving of description and comment. According to a printed record upon a plate standing near the trees, they were planted in 1738, being now 127 years old, and are thereupon represented as being of equal dimensions, viz., 98 feet high, 15 feet, 10 inches girth, 3 feet from the ground, and containing 418 cubic feet. The respective measurements made in 1864 by the writer, are as follows:—No. 1, or southward tree, girth 3 feet from the ground, 15 feet 10 inches—at 6 feet from the ground 14 feet, entire height of tree 98 feet—height from ground to lower branches 13 feet, spread of branches from top to top 85 feet. 50 feet of the trunk is straight, round, and well grown with comparatively little diminution of thickness, some of the branches are large enough to make 10 inch railway sleepers. Contents, 470 cubic feet which, at 1s. 3d. per foot, the stated price in the district would be £29 7s. 6d. No. 2, or northward tree, girth at 3 feet from the ground 14 feet 11 inches, at 6 feet from the ground 13 feet, height of tree 98 feet—height to lower branches 15 feet—girth of largest branches about 4 feet, length of longest branches 40 feet. Contents, 400 cubic feet, at 1s. 3d. per foot, £25. Both are considerably past maturity, as indicated by the decay of the tops of the branches, a true manifestation that the roots are no longer able to supply nourishment sufficient for the trees.

Taking the mean contents of the two trees at 435 cubic feet, and their mean value at £27 3s. 9d., according to the area the trees occupy, there would stand upon an acre about 9 such trees, 9 + £27, 3s. 9d., £244 13s. 9d. per acre. On comparing the spread of the branches of those trees, and their nearness to the ground, with other trees in the surrounding neighbourhood, the following are the conclusions arrived at:—

First, that other larch trees would survive to a similar age, and contain an equal quantity of timber, if allowed the same space for their development from the time of planting, and grown upon like quality of soil.

Second, that the principal causes of failure, or early decay in the larch in the plantations about Dunkeld and other places, is in consequence of too much confinement in early growth, over much moisture at certain stages of their growth, or unsuitableness of the soil to bring forward the trees to perfection.

Third, that those trees which manifest the first symptoms of decay are those that have their branches first and most severely checked.

No. III. is a Scots pine plantation in the south of Roxburghshire, 88 years planted, comprising about 100 acres, situated at an altitude between 500 and 700 feet, growing upon moorland, principally covered with heath, but some parts with coarse grasses, such as rushes, and coarser meadow grass, growing on damp ground.

The plantation covers the south eastern slope of the hill, and extends from near its base to its summit. The trees situated along the highest part of the ground are much smaller in size than those upon the lower ground where the soil is deeper, but the quality of the timber is much superior. The superior quality of the timber is quite distinguishable upon the poor, hard, and dry ground, though it is not nearly at its highest attainable state of perfection. Upon the other hand, where the soil is of better quality, but more damp and clayey, the timber is more than double the size of that of the former, but the quality of the timber is much softer and destitute of rosin, and many of the trees are decayed in the heart wood. The poor soil comprises about one-fourth the extent of the whole plantation. The trees may be considered from 9 inches to 15 inches diameter near the ground, and 30 feet to 45 feet in height. The remaining portion comprising about 75 acres, bears trees upon it 50 to 70 feet in height, with a corresponding number of cubic feet. Most of the trees are grown with clean, straight trunks, many of them with one-half to two-thirds of the height of the trees clear of branches. These, however, do not girth in proportion to their height, and moreover are the only trees in the plantation which are affected with the ground rot, while those of larger girth, and better clothed with branches, are quite sound and in a growing state.

The plantation, as it stood at 70 years' old, contained about 95 trees per acre, each tree containing on an average, 25 cubic feet = 2,375 feet at 10d. per foot = £98 19s. 2d; this divided by 70, the number of years old, gives £1 8s. 3½d. as the yearly return per acre, while the surrounding ground outside the fence

was letting for 10s. per acre, equal to (for 70 years),	£35	0	0
Original outlay upon planting, draining, enclosing, &c.	4	10	0
Compound interest on original outlay at 4 per cent.	65	11	5¼
	£105	1	5¼

From the above calculations it appears that planting in this instance has not proved so remunerative to the proprietor as letting the ground for grazing. No interest is calculated upon the rents, as it is considered the grass in the plantation to whatever account it is turned is, at least, equal to the interest.

The value of the above plantation is struck at 70 years' planted, though at that period it was not all cut down, but stood and yielded timber at the rate of 3 trees per acre annually. This continued for about 12 years, but during that period the crop did not increase in value (taking into account the trees cleared from it), but gradually decreased to the present time, when only a few straggling trees remain for the sake of the landscape. This falling in value was in part owing to ground rot in some, dry rot in others (such as those tall and thin of branches), and coagulation of the rosin in the top parts of others. Some trees were also occasionally blown down with the wind, while a general falling off in growth pervaded the whole.

The value of the thinning throughout may be considered as equivalent to the expenses of labour, and looking over the plantations, and it is also worthy of remark that this plantation might have been laid open for grazing purposes from 25 years planted, for which, as already stated, a small rent might have been obtained, at least equivalent to the interest upon the proper rents. From 50 years to 70 it would have been worth two-thirds of the ground outside the fence.

The whole of the crop of this plantation was not ripe and matured at one and same time, that on the poor, dry, and hard ground, should not have been cut down along with that upon the richer, soft, and deeper soil, because while the latter attained its highest state of perfection in 70 years, that of the former would not have been ready to cut under 120 years. Again, while the quality of the heart-wood grown upon the good soil was only equal to that of the sap-wood of the same tree in point of durability, it may justly and fairly be expected that the heart-wood of that upon the poor soil, if allowed to stand till perfectly matured and ripe, would be nearly equal in durability to that of British oak.

The timber cut from this plantation since 50 years planted was mostly used in farm building. Some of it cut at 56 years has lasted in roofs 32 years, and is still in good preservation. A roof covered with three-quarter inch boards, was in tolerably good repair at the end of 20 years. The shed was freely and openly exposed on all sides, and no thatch or slate covering upon it save only the wood. Several paling fences made from the wood, at and below 60 years planted, have stood nearly 30 years (the rails only), but these palings, shed, and roofs referred to were all steeped in a solution of corrosive sublimate. Paling made from the wood *without any preparation* stood from 7 to 9 years. A roof of ¾ boards covering a shed, in a sheltered situation, was quite rotten in 5 years. This was unsteeped in the corrosive sublimate.

No. IV. is a Scotch pine plantation in Morayshire, comprising about 1,600 acres, planted in 1803, 1804, and 1805. The plants were put in at a general distance of about 3 feet apart, or about 5,000 trees per acre. The plantation fence was kept in repair against sheep and cattle till the last planted part was 15 years old, after that date the fence was allowed to crumble down, and both sheep and cattle to go in and out at pleasure. There was no thinning till the trees were nearly 30 years planted, after that time the thinning was partially performed in a few places, though with a sparing hand; beyond a few trees used by the tenants for fencing purposes, the thinnings were not turned to any account, nor even removed from the plantation. In 1851, when the trees were from 46 to 48 years planted, a contract was entered into with a wood merchant, who purchased as a thinning of it 138,000 trees. The trees were all marked by the proprietor's men, and cut and manufactured by the purchaser. The following is a detailed statement of the contract:—

36,000	trees, to stand	4 in,	diameter	at 12 ft. from the ground,	at ¾d each,	£112	10	0
72,000	do.	,, 6 do.	do.	do.	at 1¾d do,	525	0	0
24,000	do.	,, 8 do	do.	do.	at 2½d. do,	250	0	0
6,000	do.	,, 10 do.	do.	do.	at 6d. do.,	150	0	0
138,000,	Total No.				Total Amount,	£1037	10	0

138,000 trees ÷ 1,600 acres = 86 trees average per acre thinned out, or 12s. 11½d. per acre derived from the thinnings.

Nothing further was done by way of selling till 1856, when another contract was entered upon, the number of trees to be thinned out being undefined, and the prices within a fraction of double those of the previous contract. The first contract was completed in 5½ years, the second in 7 years, thus both purchasers were at work at part of same time, but no inconvenience was experienced by either party, the arrangement for each being correctly and well defined.

During the period of the latter contract something like 120 trees per acre were thinned out, thus giving an account of a little over 200 trees per acre or about 39s. Subsequent thinnings, blown wood, and decayed trees, would amount to 100 trees more; these added to the present remaining crop of 250 trees per acre, give an account in all of 550 trees out of the 5,000 planted, thus showing that, however many trees are planted, comparatively few will come to a profitable size.

After continuing the thinning for about 10 years with a view to improve the permanent crop, which was sickly, and in a backgoing state, it was ultimately found that the per centage of trees which died was annually increasing; all hopes of recovery were then given up, and it was resolved to cut and clear the ground, disposing of the crop by private contract in suitable lots.

The following are three separate valuations of the plantation in different places :—

128 Timber trees, 7 feet each, = 896 feet, at 6d. per foot,	£22	8	0
80 Sparwood do, 5 to 8 inches diameter at 12 ft, at 1s 6d each,	6	0	0
56 Propwood do, 3 to 5 do. do. at 12 feet, at 6d. do,	1	8	0
1st Value per Acre, - -	£29	16	0
58 Timber trees, average 7 ft. each, = 406 feet, at 6d. per foot,	£10	3	0
195 Sparwood do, 5 to 8 diameter at 12 feet, at 1s 6d each,	14	12	6
68 Propwood trees, 3 to 5 do. do, at 6d each, -	1	14	0
2nd Value per Acre, -	£26	9	6
61 Timber trees, average 7 ft. each, = 427 ft, at 6d per foot,	£10	13	6
121 Sparwood trees, 5 to 8 in. diameter at 12 ft, at 1s. 6d. each,	9	1	6
30 Propwood do, 3 to 5 do. do. at 12 ft, at 6d. each,	0	15	0
3rd Value per Acre, - -	£20	10	0

If we accept £26 7s. 6d. as the medium average value per acre, and 60 years as the average age, the returns would stand thus :—

£26 7s 6d. ÷ 60 = 8s. 9½d, annual return per acre.

Against this there is a balance :—

60 years' rent for ground, at 1s. 6d. per acre, -	£4	10	0
Compound interest added yearly, at 4 per cent, -	21	8	4½
Expenses of plants, planting, enclosing, &c, about	5	0	0
Compound interest added annually, at 4 per cent,	52	11	11½
	£83	10	4

The writer would remark that since this plantation was not thinned till past the period of being benefitted, the most profitable course would have been to allow the whole crop to have stood as long as it continued in a growing condition (cutting out only decayed trees), which would have been for about 50 to 55 years, and to have sold it at one time in suitable quantities. About 550 trees per acre would have stood upon the ground, which undoubtedly would have realized a sum higher than was obtained.

No. V. is a portion of natural Scotch pine timber in Strathspey, in a clearing of forest woodland. The portion to which the following statement applies was from 75 to 85 years old. The trees were valued according to measurement standing upon the ground, and sold accordingly at the following rates:—

168 Timber trees, averaging 15 feet each, = 2520 feet, at 7½d per foot, - - - - - - - -	£78	15	0
100 Sparwood trees, 5 to 8 in diameter at 12 feet from the ground, at 1s each, - - - - -	5	0	0
80 Propwood trees, 3 to 5 in diameter at 12 feet from the ground, at 4d. each, - - - - -	1	6	8
1st Value per Acre, -	£85	1	8

140 Timber trees, averaging 14 feet each, = 1960 feet, at 7½d. per foot, . - - - - - - -	£61	5	0
80 Sparwood trees, 5 to 8 in diameter at 12 feet from the ground, at 1s each, - - - - - -	4	0	0
60 Propwood trees, 3 to 5 in. diameter at 12 feet from the ground, at 4d each, - - - - -	1	0	0
2nd Value per Acre, - -	£66	5	0

120 Timber trees, average 12 ft each, = 1440 ft., at 7½ per foot,	£45	0	0
94 Sparwood trees, 5 to 8 in. diameter at 12 feet, at 1s. per tree,	4	14	0
120 Propwood trees, 3 to 5 in do. at 12 feet, at 4d each,	2	0	0
3rd Value per Acre, -	£51	14	0

This portion of forest, of which these separate valuations are given, as representing the medium and extreme values, grew up pretty closely, and without thinning, till nine years ago, when it was considered that by thinning it the general crop would be benefited; few timber size trees were taken out of it, only sparwood and propwood. The results, however, proved very unfavourable, at the time the writer first saw the wood, it appeared to him as if partially frost bitten, and weather beaten, the foliage light in colour, and leaves short and clustered. Few trees died between the periods of thinning and finally clearing it, but many of them were blown down by the wind. An example like this might possibly give a bias against thinning natural forests, but this was an instance in which thinning could not but prove hurtful, while in other cases it would prove the very reverse.

The average value of the ground for grazing is 1s. per acre, but in consequence of this forest never being enclosed or kept from sheep, the shelter afforded by the trees is considered about equivalent to the loss of the pasture. In this instance, there is, therefore, a clear return of from 12s. to 20s. per acre, whereas under grazing alone only 1s. to 1s. 6d. per acre could be obtained, thus showing the advantage of cropping such ground with Scots pine, or rather of allowing it to grow up spontaneously.

A few other instances of the value of Scots pine as a crop in Strathspey have come under the writer's observation, amongst which are the following:—

150 Timber trees, average 18 ft. each = 2700 ft., at 7½d. per ft.,	£84	7	6
90 Sparwood do., 5 to 8 in. diameter at 12 ft., at 1s 6d. each,	6	15	0
80 Propwood do, 3 to 5 do do. at 12 feet, at 6d. each,	2	0	0
	£93	2	6

This portion of forest is about 100 to 120 years old; it was never thinned, nor protected from sheep nor cattle, or cost any outlay. Average value of ground for grazing purposes, 2s. per acre.

Another small portion of natural forest contains per acre, 450 trees, average contents 20 cubic feet = 9,000 feet, which at 8d. per foot is equal to £300. This piece of wood comprises about two acres, and was never thinned in the memory of the oldest inhabitant living in the district, which is also sustained by the appearance of the wood, some of the trees are scarcely 3 feet apart, others over 20 feet apart. The ground is steep, sloping to the north-west; the soil, poor, hard, and gravelly, the only herbage is bare, scrubby heath, and a coating of dry moss. The wood was never protected from sheep or cattle so far as is known. The age of the trees is from 145 to 160 years. A considerable number of them are affected with what is termed *roy*, being rot caused by over-ripeness of the wood. The ground for grazing purposes is worth from 1s. to 1s. 6d. per acre, being of the very poorest description. The diameter of the annual layers of wood which indicate the growth are from 1-16th to 1-20th of an inch; the trees, though at a stage past maturity, are still growing, and the foliage healthy. This is the most valuable piece of Scotch pine wood the writer is acquainted with, either natural or planted, yet the soil is next to useless for any other purpose of cropping.

Having given in the preceding instances the returns made by special plantations in certain localities, the writer will now endeavour to show in a more general way the current prices of the various sorts of home-grown timber, and will state a few of the reasons, and causes of the difference of prices, and of the various expenses connected with bringing the produce of woods into the market under various forms and conditions. The object of the writer is to show the prices proprietors are, or ought to be, receiving for the produce of their woods; but this is a difficult thing to accomplish without comparison with foreign produce. Nor can the value of rough wood be shown to advantage without referring to the manufactured produce.

The following list of prices is applicable to rough wood in the county of Edinburgh. The prices are what may be termed wholesale, or those which proprietors obtain as clear returns for their timber. The quotations are partly collected at wood sales, and partly supplied by persons in the wood trade. The wood in this instance is understood to be cut down, and pruned of its branches, to be of sound quality, and in a convenient place for loading :—

	s.	d.				s.	d.
1. Larch, 1st quality, root cut,	1	6	per cubic ft.;	whole tree	per cubic ft.,	1	4
Do 2nd do. do,	1	3	ditto	ditto	ditto,	1	0
2. Scots Pine, 1st quality, root cut.	1	0	ditto	ditto	ditto,	0	10
Do. 2nd do do,	0	9	ditto	ditto	ditto,	0	8
3. Spruce, 1st quality, root cut,	1	0	ditto	ditto	ditto,	0	10
Do 2nd do. do,	0	9	ditto	ditto	ditto,	0	8
4. Ash, 1st quality, root cut,	2	0	ditto	ditto	ditto,	1	9
Do. 2nd do. do,	1	6	ditto	ditto	ditto,	1	0
5. Elm, 1st quality, root cut,	1	8	ditto	ditto	ditto,	1	6
Do. 2nd do. do,	1	3	ditto	ditto	ditto,	1	0
6. Beech, 1st quality, root cut,	1	0	ditto	ditto	ditto,	0	9
Do. 2nd do. do,	0	8	ditto	ditto	ditto,	0	6
7. Oak, 1st quality, root cut,	2	0	ditto	ditto	ditto,	1	10
Do. 2nd do. do,	1	8	ditto	ditto	ditto,	1	6
8. Sycamore, 1st quality, root cut,	3	6	ditto	ditto	ditto,	2	6
Do. 2nd do. do.,	2	0	ditto	ditto	ditto,	1	0
9. Birch, 1st quality, root cut,	1	0	ditto	ditto	ditto,	0	10
Do. 2nd do. do..	0	9	ditto	ditto	ditto,	0	8
10. Alder, 1st quality, root cut,	1	0	ditto	ditto	ditto,	0	10
Do. 2nd do do,	0	9	ditto	ditto	ditto,	0	8
11. Poplar, 1st quality, root cut,	1	3	ditto	ditto	ditto,	1	0
Do. 2nd do do,	0	10	ditto	ditto	ditto,	0	8
12. Lime, 1st quality, root cut,	1	3	ditto	ditto	ditto,	1	0
Do. 2nd do. do,	0	10	ditto	ditto	ditto,	0	8
13. Sweet Chesnut, 1st quality, root cut, - - - - - -	1	8	ditto	ditto	ditto,	1	6
Do. 2nd do. do.	1	4	ditto	ditto	ditto,	1	0
14. Willow, 1st quality, root cut,	1	0	ditto	ditto	ditto,	0	10
Do. 2nd do. do.	0	10	ditto	ditto	ditto,	0	9

In disposing of timber at the above quotations, the proprietor must calculate upon a reduction equal to the amount of the expenses of cutting down and preparing the wood for sale, and including also the expenses of the sale itself.

In measuring timber in this district the common practice is as follows :—The trees are measured trunk and limb out as far as they girth 24 inches, 4 inches are allowed on the girth as abatement for bark upon all sorts of hard-woods, Scots pine, and larch; but only 2 inches upon spruce, the bark being in general thinner upon the latter than upon the former species of trees. It is here worthy of remark that this system of measuring is apt to mislead strangers as to the real value or price of timber, because the same allowance is made for bark upon a tree that girths only 24 inches as is made for one that girths 24 feet. Small timber by this system would be sold too cheap, and large timber too dear. The prices quoted are those at which timber is now, and has of late years been sold and bought at. There are instances in which picked trees realize prices higher than those quoted, and also instances in which it is sold lower, but these are only accidental or occasional occurrences, hence are no rule for the purchase or sale of timber in general.

The prices of wood in Glasgow to which the following quotations apply, are generally believed to be higher than in any other part of Scotland. On comparison, however, the reverse of this seems to be the case. Some classes of wood are actually cheaper in Glasgow than in any other part of Scotland. It must not be overlooked that the prices about to be quoted for Glasgow are those for timber delivered in the market, and not those given in the woods, which makes a very considerable difference.

	S.	D.				S.	D.
1. Larch, 1st quality, root cut,	1	3	per cubic ft.;	whole tree	per cubic ft.,	1	2
Do. 2nd do. do.,	1	0	ditto	ditto	ditto.	0	10
2. Scots Pine, 1st quality, root cut,	0	11	ditto	ditto	ditto,	0	10
Do. 2nd do. do,	0	9	ditto	ditto	ditto,	0	8
3. Spruce, 1st quality, root cut,	0	10	ditto	ditto	ditto,	0	9
Do. 2nd do. do.,	0	8	ditto	ditto	ditto,	0	6
4. Ash, 1st quality, root cut,	1	8	ditto	ditto	ditto,	1	6
Do. 2nd do do.,	1	0	ditto	ditto	ditto,	0	9
5. Elm, 1st quality, root cut,	1	8	ditto	ditto	ditto,	1	6
Do. 2nd do do.,	1	0	ditto	ditto	ditto,	0	9
6. Beech, 1st quality, root cut,	0	10	ditto	ditto	ditto,	0	9
Do. 2nd do. do,	0	8	ditto	ditto	ditto,	0	6
7. Oak, 1st quality, root cut,	1	8	ditto	ditto	ditto,	1	6
Do. 2nd do. do.,	1	4	ditto	ditto	ditto,	1	0
8. Sycamore, 1st quality, root cut,	3	6	ditto	ditto	ditto,	2	0
Do. 2nd do. do,	1	6	ditto	ditto	ditto,	0	9
9. Birch, 1st quality, root cut,	0	9	ditto	ditto	ditto,	0	8
Do. 2nd do. do.,	0	8	ditto	ditto	ditto,	0	6
10. Alder, 1st quality, root cut,	0	9	ditto	ditto	ditto,	0	8
Do. 2nd do. do.,	0	8	ditto	ditto	ditto,	0	6
11. Poplar, 1st quality, root cut,	1	0	ditto	ditto	ditto,	0	10
Do. 2nd do. do,	0	8	ditto	ditto	ditto,	0	7
12. Willow, 1st quality, root cut,	1	0	ditto	ditto	ditto,	0	10
Do. 2nd do. do.,	0	8	ditto	ditto	ditto,	0	7
13. Lime Tree, 1st quality, root cut,	1	2	ditto	ditto	ditto,	1	0
Do. 2nd do. do,	0	9	ditto	ditto	ditto,	0	8
14. Sweet Chesnut, 1st quality, root cut, - - - - -	1	10	ditto	ditto	ditto,	1	8
Do. 2nd do. do.,	1	0	ditto	ditto	ditto,	0	10

The following are quotations of the prices of different sorts of the principal description of manufactured timber and small wood sold in the Glasgow market. The differences of price of the manufactured wood as in the rough timber is owing to quality :—

						s.	d.			s.	d.
Scots pine	inch	boards,	1st quality			12	6	per 100 feet.	2nd quality,	8	6
Do.	¾	do.	do.			9	0	do.	do.	6	0
Larch,	inch	boards,	1st quality,			16	0	do.	do.	12	6
Do.	¾	do.	do.			12	0	do.	do.	10	0
Spruce,	inch	boards,	do.			12	0	do.	do.	8	0
Do.	¾	do.	do.			8	0	do.	do.	5	6
Larch staves	½	inch thick,	per thousand	superficial	feet.				-	70	0
Scots pine do.	½	do.	do.	do.	do.				-	35	0

Birch staves of same thickness three years ago realized 50s. per 1,000 feet, but are now all but unsaleable at any price, being superseded by the larch—the latter answering the purpose equally well, and having the advantage of being much easier wrought :—

	s	d
Larch sleepers, 9 feet long 10 × 5 each, ...	3	3
Scots pine, do. do. do. . . .	2	6
Spruce, do. do. do.	2	6
Sleepers (Scotch Pine) for mining purposes 3½ feet long 5 × 2 per 100 lineal feet, ...	11	0
Sleepers (Larch) for mining purposes, 3½ feet long 5 × 2 per 100 lineal feet, ...	14	0
Pit props (Scotch Pine) 3½ to 4½ diameter per 100 lineal feet, .	5	0
Do. (Larch) Do. do. do. do. .	6	3

From the above quotations deductions are easily made so as to show how far any proprietor is receiving for his rough wood a fair value, comparing it with manufactured wood and *vice versa.* The following example will show how this is done. If a Scots pine sleeper is manufactured in Strathspey, and sold in Newcastle market at 2s. 6d., how much can the timber merchant give the proprietor for the rough timber per foot in the wood?—

Cutting down and cross cutting per sleeper - -	0¾d
Loading and carting to saw mill, half a mile, - -	0½d
Sawing, including wear and tear of machinery, -	1½d
Loading and carting to railway station 4 miles,	3d
Railway carriage 50 miles, and loading trucks, -	4d
Shore dues, - - - - - - -	1d
Freight and Commission, - - -	4d
	1s 3d
Timber required for 10 in sleeper 3 feet, at 5d per ft	1s 3d
Price of sleeper, - - -	2s 6d

From the above statement it is evident that 5d. per foot is the highest price that can be given for sleeper wood in Strathspey, or in any district similarly situated. Other examples might

be given if necessary, but we will only instance that of larch sleepers, with the above detailed expenses, thus:— 1s. 3d.
Timber required for 10 inch sleeper 3 feet, at 8d. per ft. 2s. 0d.

Price of sleeper, - - - - - 3s. 3d.

The next quotations show the prices of foreign and home-grown timber, known to bear nearly an equal value to each other.

HOME GROWTH.			FOREIGN GROWTH.		
Boards, *per* 100 *superficial feet.*	S.	D.	Boards, *per* 100 *superficial feet.*	S.	D.
Scots pine one inch, - -	12	6	Dram red wood one inch,	14	0
Ditto, ditto, - -	10	0	Ditto, white wood ditto,	11	6
Spruce, ditto, - -	11	0	Norway spruce, ditto,	10	0
Cubic foot scantling.			*Cubic foot scantling.*		
Natural Highland pine, -	1	4	Memel, - - - - -	2	0
Oak squared, - - -	3	0	Quebec oak, square, -	2	9
Elm ditto, - - - -	2	0	American elm, ditto, -	1	9
Birch ditto, - - -	1	2	Quebec birch, ditto, -	2	0

It is difficult, in some cases, to account for the difference of price; quality does not account for it—*e. g.*, 2s. per foot is paid for Memel, which for strength and durability does not surpass, if it even equals the natural Highland pine of Scotland, yet one-third less is paid for the latter. On the other hand we have American elm at 1s. 9d., said to equal, if not to surpass the home growth at 2s. per foot.

The following statement refers to prices of timber in Roxburghshire obtained principally at auction sales. In that part of the country the greater proportion of the timber is used upon the estates upon which it is grown, hence only a comparatively small quantity is disposed of in the market, and which is generally cut down, laid in lots, and sold by public roup realising of late years the following prices:—

			S.	D.				S.	D.
Larch,	1st quality,	root cut,	1	4	per ft. cube;	whole tree	per cubic ft.,	1	2
Scots Pine,	do.	do,	1	0	ditto	ditto	ditto,	0	10
Spruce,	do.	do.,	0	10	ditto	ditto	ditto,	0	9
Ash,	do.	do.,	1	8	ditto	ditto	ditto,	1	6
Elm,	do.	do.,	1	6	ditto	ditto	ditto,	1	4
Oak (Peeled),	do.	do.,	2	0	ditto	ditto	ditto,	1	6
Beech,	do.	do.,	0	9	ditto	ditto	ditto,	0	7
Birch,	do.	do.,	0	10	ditto	ditto	ditto,	0	8
Sycamore,	do.	do.,	2	0	ditto	ditto	ditto,	1	0
Alder,	do.	do.,	0	10	ditto	ditto	ditto,	0	8
Lime Tree,	do.	do.,	0	10	ditto	ditto	ditto,	0	8
Poplar,	do.	do.,	0	10	ditto	ditto	ditto,	0	8
Willow,	do.	do,	0	10	ditto	ditto	ditto,	0	8
Sweet Chestnut,	do.	do.,	1	6	ditto	ditto	ditto.	1	0

Considering the rural enterprise of the people in Roxburghshire, the improvements upon land, fencing, cottage accommodation, farm building improvements, &c., timber would reasonably be expected to be much higher. The causes, however, which combine to keep down the prices are very evident:—In the first place, most proprietors manufacture and use in the improvement of their own property their own timber, employing both the largest portion, and the best quality. Hence the disposable part of their wood is either of an inferior class of small quantities in one particular spot, or is so unfavourably situated for clearing the wood, that timber merchants consider such sales unworthy of their patronage, and seldom attend them except to purchase oak for ship building. Since, however, railways have been extended into and intersect the country, public sales are better attended by persons from a distance, consequently some sorts of timber are rising in price. This was manifested at a public sale near Jedburgh, when young peeled oak 45 years planted realized 1s. 6d. per foot, similar descriptions of wood in the same district ten years ago would not have sold for more than half that price. Upon a few estates in Roxburghshire and Selkirkshire timber is sold by private contract upon a limited scale. In such cases the trees are selected, cut down by the proprietor, and measured lying upon the ground, the purchaser cross-cutting, and removing them at his own expense. Timber sold in this way is generally charged at a rate higher than is common at auction sales. If only a part of the tree is taken (the root cut) from 1d. to 2d. per foot more is charged than for the whole tree.

Having stated that most of the disposable part of the wood in this part of the country is sold by public roup, it may be well to make a few statements upon the advantages and disadvantages attending such sales. In preparing the wood for sale, it is cut down and arranged in such lots as it is anticipated will suit the forthcoming purchasers. The description of sale of course varies according to the sorts of wood submitted, and the district in which it is situated. The wider apart the lots are situated, and the more difficult to clear off the ground, so in proportion will they sell at a lower or higher figure; and again, the greater the variety of the timber trees, and frequently the smaller the sale, so also will be the price, provided it is a considerable distance from town or village. Small sales of wood in the vicinity of a town generally command higher prices than large ones. One advantage of a promiscuous small lot of wood being disposed of by auction is, that the general public are supplied, each individual attending being enabled to purchase the quantity and quality of wood he requires for his own special and particular purpose. Promiscuous and varied though the wood for sale may be, the requirements of the company collected on such occasions are generally equally varied. If, therefore, the lot to be disposed of is only or scarcely sufficient to meet the demands of the purchasers, the sale is spirited, and the purchase of each lot not only well contested, but raised to or over its value.

It not unfrequently happens, however, that at auction sales only a few individuals make their appearance, who are local purchasers, acquainted with each other, each knowing nearly to what extent and which sort his neighbour intends to purchase, hence a dull competition. This is not, however, of nearly so frequent occurrence in Roxburghshire as it used to be in former years. Through the facilities afforded by railways for travelling, purchasers now come from a greater distance, whose persons and business are less known to each other; hence, when the quantity and quality of the wood are worthy of attention, the timber closely situated together, of one sort, and of ready access for loading, Roxburghshire does not fail to command such prices as have been quoted. The principal purchasers are coopers, who buy Sycamore, Birch, Poplar, and Ash; wheelwrights, who buy Oak, Ash, Elm, and Larch; millwrights, who buy Birch, Elm, Oak, Ash, and Pine; and carpenters, who buy Pine, Fir, and hardwoods of various sorts. Wherever the sales are of sufficient importance, one or more timber merchants generally attend, who pick up the best of the wood for shipbuilding, but of course not at so high a price as if making a large purchase in one place.

The following list comprises the prices of timber in Inverness and Morayshire, including natural Scots Pine of the best quality in Britain:—

			s.	d.			s.	d.
1.	Larch, 1st quality,	root cut,	1	2	per ft.	Whole tree per cubic ft.	1	0
2.	Scots Pine (planted),	,,	0	7	,,		0	6
3.	Do. (natural),	,,	0	8	,,		0	7
4.	Spruce,	,,	0	7	,,		0	6
5.	Ash,	,,	2	0	,,		1	10
6.	Elm,	,,	2	0	,,		1	9
7.	Oak,	,,	2	0	,,		1	8
8.	Beech,	,,	0	8	,,		0	7
9.	Birch,	,,	0	7	,,		0	6
10.	Alder,	,,	0	7	,,		0	6
11.	Poplar,	,,	0	8	,,		0	7
12.	Limetree,	,,	0	8	,,		0	7
13.	Willow,	,,	0	8	,,		0	7
14.	Sycamore,	,,	3	0	,,		1	6
15.	Sweet Chestnut,	,,	1	8	,,		1	2

On comparing the prices of timber in this district with those in other parts of Scotland, it will be seen that some of the former are fully as high as the latter, such, for instance, as Oak, Ash, Elm, which are scarce in the country. Others, as Larch, Spruce, Scotch Pine, and Birch, are cheaper. The comparative cheapness of the latter is owing not so much to the large quantity grown and sold, as to the difficulty of clearing it off the rough and rocky ground, and the distance it has to be conveyed to market. Comparatively little of the timber manufactured in the north is used on that side of the Tweed. It is either shipped or sent by rail to Newcastle, Sunderland, Glasgow, London, and other places south. The local uses to which most sorts of timber in the north are applied are similar to those of the south. The exceptions to these are Pine, Fir, and Birch, which are manufactured into boards of various descriptions, barrel staves, and sleepers for railways and mining purposes, all of which are disposed of in the south markets.

The systems of measuring timber here again differ from those previously mentioned, and may be stated in few words, making allowance for incidental deviations. A tree is considered timber size that girths 26 inches over the bark at 12 feet, and is sold by the foot. Trees below that girth at 12 feet from the ground are termed poles, and are denoted, according to size, spar-wood and propwood, and sold at so much each, or by the dozen or hundred. Timber trees (Pine and Fir) are measured out in the top to 26 inches over the bark, girthed in the centre between that point and the base, and an allowance of 2 inches abated for bark. In measuring hardwoods, the centre of the tree is also taken for the mean girth, and 2 inches abated for bark as for Pine. This rule is more capricious than just and fair. The allowance for bark upon large trees is a great deal too small.

It is generally believed that Scotch Pine produced from seed naturally sown in the forest is of superior quality, but the writer, who has had extensive opportunities of observation, has arrived at the conclusion that suitability of soil and climate, rather than spontaneous growth, produces the superiority. In Strathspey, where trees of spontaneous growth and planted trees are growing up side by side with each other, of all ages, size, and description, there is to the writer no visible difference, neither is there when cut down, either in point of durability, strength of fibre, specific gravity, lustre, or colour. The shining rich surface of dressed Highland Pine is such as often leads strangers to the conclusion that it is dressed with French polish, or varnished. This appearance, however, is not confined to Pine of spontaneous growth, but is equally manifest in planted timber of similar age grown in the same district. The bright reddish yellow, too, of matured Pine has much the appearance of sound Larch, grown upon clay soil, but this, too, is equally visible in planted as in natural timber. The writer not only sees daily fencing posts of natural Pine, which have stood in the ground for above 30 years, and are yet sound and likely to stand many years longer, but he assisted five years ago to take a planted Scotch Pine post out of the ground which was put in when the plantation, of which it formed a gate post, was enclosed in 1833, having thus stood 26 years, in good preservation, except the sapwood, which of course was long previously entirely decayed. This happened in Roxburghshire, where the plantation from which the post was taken stood on a bleak hill top, about 850 feet altitude, the soil dry, hard, and gravelly, similar to that upon which the best natural Pine is grown in the Highlands. At the time the post referred to was cut out of the plantation it was about 120 years old, thus showing that, unless Scotch Pine timber stands till of a great age, the quality of the timber is inferior. No question is more difficult to solve than that, when timber should be cut down as ripe. One crop of Larch hop poles is at its highest point of value at 12 years, another not till 17 years. A crop of Larch 6 feet apart, fit for railway purposes, such as sleepers, is ripe at 40 years. Again, a crop of Scotch Pine is at its highest state of perfection and value at 50 years, another at 70 pears. One portion of natural Scotch Pine forest is at its highest perfection in 90 years, another portion not ripe till 110 years, another at 130, and even at 140 years, the writer has seen trees cut down at a stage far below perfection, the nature of the soil and thinning determine either. Oak timber, 10 feet apart, upon clay soil, with free open sandstone substratum, sheltered situation, never thinned, ripe at 90 years. Another portion of Oak plantation, 30 to 50 feet apart, upon dry loam, gravelly subsoil, freely exposed, frequently thinned, ripe at 120 years. Ash, upon moss ground, with a dry and sandy subsoil, mixed with Pine and Firs, ripe at 30 years. Another piece of Ash, 10 feet to 12 feet apart, upon moderately good dry soil, rather exposed, ripe at 60 years.

As the expense connected with preparing and bringing the timber to market constitutes a very important item, and influences the value to the proprietor very considerably, it may be well to give a few statements upon the subject. Without attempting to enumerate the various systems, or lay down any positive rule, the writer will state what he has met with in practice, from which inferences may be drawn. For cutting down Pine and Fir with felling saw, sneading and crosscutting the same into lengths of not less than 9 feet, i.e. where a clean cut or clearing of the wood is made, one farthing per cubic foot is sufficient. Where difficulties in felling are to be encountered, where the trees are unduly clothed with branches, or the ground is rough and steep, one halfpenny per foot is required. These prices include shaving off the rough bark from the trunk of the tree, which is done with a view to render the wood more smooth and easily drawn, and making it more light for floating, loading, or other handling. A 15 feet log is more easily drawn with the bark shaved off than a 10 feet one with it on, and when snow and ice cover the ground, a 40 feet tree will glide along with greater ease than a 20 feet one without such relief. For carting rough wood in blocks such as two men can load, a distance of from ¾ to 1 mile, ¾d. per foot is sufficient where the road is good, but when the road is in such bad repair that proper loads cannot be taken, nor the horse walk at freedom, one penny or even 1¼d. may be required.

The next form of expense entailed upon timber is that of manufacturing it, which is in general done at saw mills, propelled either by steam or water power. The following are the prices at which timber of common dimensions is manufactured. They include all manual labour, and wear and tear of machinery :—

Railway sleepers 9 feet long, 10 × 5 each,		. . . .	0	1½
Do. do. do., 9 × 4½ do.,		. . . .	0	1¼
Larch, spruce and Scots Pine boards 1 inch thick, per 100 feet,			1	3
Do. do. do. do.	¾ do.	do.,	1	0
Do. do. do. do.	½ do.	do.,	0	9
Do. do. do. Staves	½ do.	1,000 feet,	3	6
Birch, Do.	½ do.	do., .	4	0
Scantling for roofing,		lineal feet 100,	1	0
Do. small sizes as 3 × 3, 3 × 4,		Do. do.,	0	8
Beams of large size 7 × 7, and upwards per cubic feet,		. .	0	1

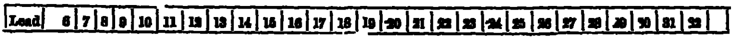
The above prices apply to pine and fir only, for sawing hard wood ¼ to ⅓ more money is required.

The season of the year, as well as the age of the tree ought to be regarded in cutting valuable timber. The following are the results of the writer's experience upon the subject :—Oak, for the sake of its bark, ought to be cut as early in the season as the sap flows freely. It matters little at what season of the year timber is cut as respects the heart-wood; while it is a matter of great consideration in regard to the sap-wood. The writer has seen pine timber cut in June become discoloured in two weeks, while if cut in winter the same sort of wood will lie upon the ground two or three months without becoming discoloured. Discolouration proceeds from fermentation, which renders seasoning the timber difficult, and imperils its condition when manufactured. In cutting down large timber, the following is the system preferred by the writer. The tree is first cut in by an axe to the depth of a few inches upon the side to which it is intended to fall. Upon the side opposite to that cut with the axe, the felling saw is entered in such a position as to cut through the tree two or three inches above the lower part of the axe cut. When the saw is sufficiently advanced, two socket wedges are driven in to any required distance, so as to cause the tree to fall in the place intended, which is thus done with greater certainty than by axe cutting merely. Considerable difficulty is always experienced in felling large trees growing in a reclining position, by the weight of the upper part of the tree on the side to which it inclines, causing it to give way before the saw is sufficiently advanced, resulting in the splitting of the trunk. To prevent this, a strong chain is used, provided with a screw and key attached to one end of it. This screw works through the links of the chain in any convenient length to suit the thickness of the tree. It is applied round the base of the tree, close to the saw cut, and when properly tightened entirely prevents splitting. A system of axe cutting, possessing considerable merit, is practised extensively upon the estates of the Marquis of Lothian, in Roxburghshire. The axe used for the purpose is long and narrow in the face, which enables the woodman, in the act of cutting to coop out the stool, so that when the tree is felled the stock is left in the form of a basin, in which water stands after the first shower of rain falls. The advantages of the stools being left in this form are that in a very short time they are quite rotten and out of sight, which imparts a neat and level surface to the ground, and frees it of what is often experienced a barrier in replanting, and hurtful to the plants. In spite, however, of the most dexterous axemanship which is there practised, there is a comparative waste of timber over that of saw felling, the greater, of course, in proportion to the diameter of the tree.

A proper mode of measuring is an important element in the disposal of timber. Having adopted various methods, and made several experiments upon measuring standing and lying timber, the following is the practice adopted by the writer, and which he believes to be the best, being simple, easily practised, and fair between purchaser and exposer.

First, in measuring Pine and Fir timber lying upon the ground, he measures from the base of the tree up to where it girths 26 inches over the bark, or 24 inches under the bark girths the tree at the centre or mean distance between the base and the first named girth, abating on this second girth one inch for every foot of girth as allowance for bark. The fourth part of this girth is the side of the square in inches, and the contents are found at a glance by the sliding rule, or Hoppus' timber measurer. In Ash timber, the trunk only (without the limbs) is measured, and is followed out to 26 inches over the bark. The tree is measured in as many lengths as may be thought proper, but none of them less than 6 feet—allowance of one inch to the foot in girth. Elm, Sycamore, Birch, Willow, and Poplar are measured similar to the Ash. In Oak, the system is somewhat different; the trunk proper is measured out like the others to 26 inches over the bark; it is also girthed in sections as the others; but, in addition to the main trunk, the largest limb is also measured—*i. e.*, if it is 6 feet long and 26 inches girth, but no smaller limb is included. Though the bark of Oak timber is of considerable value, yet allowance is made for it as for other trees, because of the uselessness of the sapwood, against which it is a set off.

Having described his practice as to felled timber, the writer will now explain his system of measuring standing timber. Before commencing, he provides himself with a leather strap marked or graduated, a pole, a marking axe, and a red lead pencil, or a small brush and paint. The strap may be any convenient length, from 15 to 20 feet, ¾ of an inch broad, and of the strength of a small bridle rein, with a piece of lead attached to one end of it. Previous to marking the strap with the necessary figures, the leather should be alternately wet and dried, as it is apt to shrink and expand when in use, according to the state of the weather. A seasoned gig rein, when reduced to proper dimensions, forms an excellent strap. Such straps, so far as the writer is aware, are not to be bought in the shops, but must be home-made, and marked as in the annexed figure:—



6 being the first figure upon the strap, is exactly 26 inches from the end, including the lead, and is the side of the square. The next figure is 7, being 27⅔ from the end of the strap, and so on; the cross stroke indicates half inches—quarter inches for common practical purposes are seldom used, but are indicated on the strap by a dot, and may be used if required. The pole used for taking the height is fourteen feet long, marked feet and half feet. The lowest mark is at 6 feet, at which the trees are mostly girthed; thus by an expeditious and simple process the contents of the first 12 feet of the trunk are found. This is a simple, expeditious, and safe method of measuring standing timber, either for sale, transfer, or other purpose—a method, in the writer's experience, surpassing for speed and accuracy all others that he has either himself tried or heard of; but one, at the same time, the accuracy of which depends upon matured judgment and experience. Though the use of the slide is recommended for casting up the contents of a tree, yet in extensive practice it is seldom used. Having the length of the section (or whole tree), as indicated by the pole, and the girth, by which the side of the square is shown, as indicated on the strap by passing it round the tree, the relative proportions of length, girth, and contents soon become so familiar to the mind that no casting up is required. A few examples will show this, taking the section at twelve feet in length, the following are the results sufficiently near for practical purposes:—

12 ft. long,	6	in. side of the square,	¼ of length,	3 ft. true contents.
Do.	7	,, ,, ,,	⅓ ,,	4 ft. 1
Do.	8½			6 ft. 3
Do.	10			8 ft. 4
Do.	12		1	12 ft. ,,
Do.	14		1⅓	16 ft. 4
Do.	15		1½	18 ft. 9
Do.	17		Double	24 ft. 1
Do.	21		Triple	36 ft. 9
Do.	24		Quadruple	48 ft. ,,

The relative proportions are easily remembered, which greatly assist the measurer in arriving at the contents of a tree. The intermediate figures soon also become familiar to the mind when extensively in practice. In making the strap, it is advantageous to mark one side with white paint for measuring peeled timber, when no allowance is made for bark; thus the side of the square of a tree 3 feet in girth is 9 inches. The other side may be marked with red paint, allowing for bark at the rate of one inch to the foot in girth; thus the side of the square of a tree that girths 3 feet is indicated upon the strap 8½ inches, and so on in the same proportion throughout the whole length.

The purposes to which timber is applied are various. For Larch the principal and best quality is used for boat and ship building, for which the proprietor receives from 1s. 3d. to 1s. 6d. per foot. The most valuable part of the larch tree for boat building is that portion of it where the strong horizontal root forms an angle with the trunk. In order to procure those valuable crooks or knees, as they are termed, the tree in place of being cut down in the usual way is grubbed up by the root, carefully preserving the main roots to a length of 2½ to 4 feet according to size, with a portion of the trunk attached of about the same length. This is placed upon a saw pit and reduced to the desired thickness, and is used in the vessel in supporting the decks. Larch is also extensively used by carpenters, builders and others in forming trams for carts, beams, and lintels in buildings, bridges, fencing, &c. The demand for larch timber of large dimensions, and sound quality, at the present day far exceeds the supply—hence the great inducement there is to plant where the soil is capable of bringing larch to proper maturity, and to a large size.

Oak is used to some extent in almost all superior buildings in the form of safe-lintels, door-posts, staircases, &c. Various implements of husbandry are also partly or wholly made from oak, but its principal and chief consumpt has hitherto been, and still is, for ship-building purposes, for which there is always a ready market. The descriptions of trees most esteemed for ship-building are those either with a tall, straight, clean trunk, or those of a short crooked bole capable of squaring to at least

8 to 9 inches free of sap-wood. Timber of either of these descriptions realises the highest price in the market for ship-building. The timber merchant generally makes higher profits by short crooked timber in retailing it, than by any other sort, in consequence of small trees being classed for sale at a price per foot lower than that of large trees. The oak is longer in attaining maturity than most other trees, yet it pays well upon suitable soil, perhaps better than any other tree. In confirmation of this opinion, the writer would remark:—In the county of Sussex, a few years ago, he became acquainted with an oak wood in which he found twelve oak trees standing upon about an acre of ground. The trees on an average contained 200 cubic feet each, = 2400 feet at 2s. 6d. per foot (including lop, top, and bark, the usual conditions of sale), amounts to £300 per acre. The trees apparently were 150 years old, but to all appearance quite sound. Situation sheltered; soil rich, deep, light loam.

An oak tree is growing near the Abbey at Dunkeld, Perthshire, in a sound, healthy condition, which appears to have been planted at the same time as the two larches previously described in this report, which are growing close by it, and are said to have been planted in 1738—making the oak tree 126 years planted. It girths 11 feet 8½ inches at 6 feet from the ground, is 90 feet high, with a symmetrical trunk, clean, and well-grown to a height of about 50 feet. This tree covers about 1-9th of an acre, and contains about 300 cubic feet, which, at 2s. 6d. per foot, including bark and branches, =£37 10s. Thus an acre of such trees would be worth £337 10s. It is not, however, at full growth, but to all appearance may remain healthy and growing till it is 150 years old. On the estate of Ferniehirst, near Jedburgh, there is an oak, also of considerable interest, known as the king of the wood, the age of which is unknown, but is apparently about 200 years. It girths 14 feet at 6 feet from the ground—height 55 feet, spread of longest branches 45 feet, and covers about 1-7th of an acre. The height from the ground to lowest branches is 10 feet, and it contains about 300 cubic feet, at 2s. 6d. per foot, including bark and small wood, = £37 10s. An acre of such trees, with similar advantages for freedom of development from time of planting, would be worth £262 10s. The situation of this tree is moderately sheltered. Altitude about 300 feet; soil hard, tilly, and dry, on top of a glen 50 feet deep.

SCOTS PINE and SPRUCE are in demand for deals and scantling; also for railway sleepers, but from the prices obtained (2s. 3d. to 2s. 6d. each), it is evident that such sleepers must be manufactured from second-class timber and coarse tops of trees. Mature, properly-wooded Scotch pine is rarely to be met with in the Lothians, hence it is seldom used in first-class buildings; spruce, on the other hand, is comparatively better of quality, and in some cases answers for roofing buildings, such as breweries and stables in which, if the wood is at full maturity when cut, it is less liable to dry rot.

BIRCH of first-rate quality has greatly advanced in price within the last few years, particularly such of it as is grained like maple, for which 2s. per foot is readily obtained. Small and inferior sorts are used principally for turnery purposes, and is sold by weight; also for charring either for household use, or for powder and forges. There are certain growths of birch of a rare, artistic-like appearance, surpassing all that the hand of the most skilful carver could possibly execute. Such growths are only detected by the experienced eye; those unacquainted with them may pass them by without observation. All that is necessary to do in procuring them is to peel off the bark early in spring, or at least as soon as the sap flows; if later in the season, where alburnum has begun to form, the wood is darker, and not so bright and shining when polished. Birch thus procured is employed in various ways, such as for fancy furniture for lobbies, pedestals for flower vases, tables for grottos, &c. The writer has seen birch of this description considered fit only for fuel, and worth only a few pence, when properly dressed, seasoned, and varnished, become worth several pounds.

SYCAMORE.—For choice cuttings higher prices are realised than for any other plain sort of home-grown wood. In November 1863, a sycamore tree near Newbattle was sold by auction which realised 5s. per foot A few years ago several sycamore trees were sold on the estate of Ochtertyre, in Perthshire, which brought from 4s. 6d. to 5s. per foot. This class of timber is used principally in making musical instruments; the principal buyers are from Manchester. Another class of sycamore is in request by joiners for furniture-making, for which high prices are also obtained; but the chief and great demand is that for turnery purposes, and for which from 2s. 6d. to 3s. per foot is given. The demand for this latter class of wood is steadily on the increase, owing doubtless to the increase of machinery. When we take into account the rapidity of the growth of sycamore, combined with the ready market of it, and the high prices which it obtains, there appears every inducement to plant it extensively.

ASH.—There is no species of forest tree so much in general esteem as ash. Of its merits we need not speak, as all who ever handled a tool well know them. For the best quality of ash high prices are given. Carpenters, mill-wrights, wheelwrights, joiners, coopers, coach builders, and ship builders, are each equally desirous of purchasing ash. It is extensively used by all of them, and none can do well without it. Young and vigorous growing ash is most in request where strength and elasticity combined are required, as by coach builders, coopers, and wheel wrights. Ash well matured, and when strength and durability are more essential than elasticity, is in request by ship builders, carpenters, and mill-wrights; while that which is of least value, on account of the shortness of the grain of the wood, is highly esteemed by joiners for furniture.

Certain pieces of ash, grown in a way to show the grain of the wood to great advantage, when used in veneering (and which growth is termed burrel), can be sold in London for 6s. per foot. This grain is considered more elegant in furniture than either maple or mahogany, and is gradually coming more into fashion. Ash, therefore, is a tree which proprietors cannot well plant too extensively, provided the soil is suitable, and the plantation within a reasonable distance of either a town, shipping port, or railway station.

Sweet Chestnut is a valuable tree if quite sound, which, however, is rarely the case, it being very frequently what is termed ringshaken; under such circumstances it is of little or no value save only for gate posts or large scantling. When sound it is used for purposes similar to oak except in ship building. In Lloyd's Register of British and foreign shipping, where almost every other sort of home grown timber is specified how and in what manner it is to be used, the sweet chestnut is omitted. This is said to be owing to its liability to split by a ball or concussion. In Scotland comparatively little sweet chestnut is either grown or sold, while in England it is grown extensively. Though the timber in old trees is almost always ringshaken, yet for posts, fencing of various kinds, and certain timbers in buildings, it is a wood next in value and durability to that of oak.

Alder in this part of the country is principally used for turning purposes, toy manufactory, charcoal, and breaks for railway carriages. For the latter purpose there is an increasing demand, and one likely soon to consume all the available alder for this purpose.

The Lime is extensively used for carriage brakes, and is also in considerable demand for charcoal, and the boards of leather cutters, also for carving and turning purposes.

Poplar and Willow having properties in many respects alike, are used for purposes much the same, such as flooring for bedrooms. Its recommendation being its incombustibility, and being a comparative non-conductor of sound, it is suitable for packing boxes for furniture or other goods requiring large packages, being light, tough, and strong in the grain. The scarcity of the wood alone causes it to be used so little for the purposes named. It is also an excellent paling wood, and is very suitable for lining stone carts, for cutting boards, &c.

REPORT ON MURRAIN.

By George Armatage, V.S, Pensher, by Fence Houses.

Premium—the Gold Medal.

Murrain—or, as it has been variously denominated panzootic aphtha, and epizootic aphtha by continental writers; exzema epizootica of Professor Simmonds; and in the vernacular, foot and mouth complaint; epidemic; the blister, &c, &c.—is an exanthematous or eruptive febrile disease of horned cattle, possessing contagious characters, by which it is capable of propagation and communication to man under certain circumstances, and most other animals.

Like all diseases of similar characters which appear in man and the lower animals, murrain is considered liable to attack an individual only once in its lifetime; this, however, is erroneous, as well authenticated instances prove that animals have suffered more than once from its effects, but as a rule not by any means so severely, although exposed to influences of a specially extreme character.

Its contagious and infectious properties are truly verified in the numberless instances in which the symptoms are so speedily exhibited in cattle on farms where others are introduced, labouring under the affection, horses, pigs, dogs, and even fowls* not escaping; and by the rapidity with which it is communicated from one herd to another in the vicinity. This depending—as in all highly contagious diseases—upon the blood being primarily affected through absorbtions by the lungs, or mucous surfaces, innoculation, &c., which developes a poison the true nature of which is unknown, and communicable by the natural secretions, or resulting diseased products in its true type to other animals. The poison of aphthous disease, no matter how conveyed, is not only very delicate, but permanent in its general characters, as evidenced by the fact that animals become affected when turned upon pastures or into byres where diseased cattle have not been for some considerable time.

The distinguishing characters of murrain are, however, variable in their intensity; at times being comparatively mild, at others virulent; and as such it has been styled "malignant epidemic" by older writers—Government being aroused by its nature and tendencies to issue its first legislative enactment with reference to it in March, 1745. But within the past twenty years, although it has prevailed to such an extent, that the three kingdoms may be said to have never been free, it has doubtless mainly arisen from the importation of foreign cattle—being propagated by contagion. In various private communications from veterinary surgeons in active cattle practice, received by the writer, Irish and Dutch cattle are said to have much to do with the prevalence of the disease in this country.

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* *Veterinarian*, September, 1864, p. 661.

Although it cannot be said the mortality from the attacks of murrain, is so great as its prevalence and nature would at first sight lead us to suppose, it is productive, however, of serious losses, especially to the dairy owners of large towns, and the districts near London, when stock is frequently changed or added to from markets; farmers and others also complain of the frequency with which they have to battle with the affection, either as an interruption to the process of fatting, or milking properties; in which latter case all symptoms are increased in their severity, and fatal termination by complication with other diseases as a result of irritative fever always to be dreaded.

Symptoms.—These vary to some extent in their general aspect in proportion to the habits of the animal affected, characteristics which may be said to be common to certain species, and also to some extent with the mode in which the poison is introduced to the system.

A brief period of incubation occurs, which may vary from one to four or five days, when probably a short, dry, husky cough may have been noticed; a fit of shivers supervenes, the animal is dull, and if he is in the pasture, is found apart from the rest; the coat stares, and temperature of the body variable and unequal.

If the hand be passed over the spine the animal winces, and if the skin be included in the pressure of the fingers he crouches, and evinces great tenderness. The pulse is accelerated; appetite capricious, a ropy saliva drivels from the mouth, which rapidly augments in quantity, he smacks his lips, symptoms which denote the formation of large and well defined vesicles—from the size of a pea to that of half-a-crown in some instances—on the tongue, which is swollen, and sides of the mouth and lips, and sometimes on the nose and schereiderian membrane, from which intense pain is given. In a few hours they burst, and expose red and extremely sensitive patches, giving exit to a thin serum containing all the elements necessary for the communication of the disease to another animal, in favourable cases being quickly covered by epithelium. About the fifth or sixth day, the animal begins to take his ordinary food with a tolerable degree of ease considering the severe state which the mouth has exhibited.

Sometimes the feet are also attacked in conjunction with, or prior to the mouth being affected, when the animal persists in lying down, or stands with the back arched, in evident pain and distress; the coronets are covered with vesicles which extend to the interdigital spaces and around the heels, requiring but very slight pressure to cause them to discharge their contents. Accelerated respiration and circulation, with intense pain, lameness, and inability to stand, swelling, with great heat and tenderness, are the early symptoms, which, aggravated by the general uneasiness of the animal, and vascular nature of the parts under the affection succeeded by sloughing of the integuments, or hoof, or both, exposing bones and subjacent tissues—the latter perforated by sinuous abscesses.

If the disease assumes a mild vesicular character in old animals, and proper precautionary measures are resorted to, the febrile symptoms will subside about the fifth day; but when the patients are young, especially when drawing naturally their food from the teat, or fed upon milk from cows whose glands are affected, and in milch cows, not only do we find the severity of the symptoms increased, but complications of more or less obstinacy to deal with.

Young sucking animals suffer from the mouth, fauces, gullet and digestive canal becoming implicated in the vesicular eruption, the irritation and soreness from which prevents the taking of sufficient food; colic and diarrhœa add to the general systemic disturbance, quickly carrying off the creature.

In milch cows the teats are involved with the mammary gland, which becomes hot, swollen, and painful; the vesicles are burst in the process of milking, or by the sucking calf, exposing raw surfaces which, however, speedily dry, the scab from which is removed each time by the hand of the milker, giving rise to greater pain and rendering the animal opposed to the operation; the milk is retained, and by its presence acts as a foreign body, creating inflammation within the gland.

All symptoms now assume an aggravated form, and great agony is exhibited as complications occur. Fever is increased, as also are the respiration and circulation; the heart may be heard in some instances to beat many paces distant; ulceration and sloughing succeeds the tumefaction of the phalanges; the back is arched as the animal stands agonisingly foaming at the *mouth*, champing and smacking; the breath is fœtid, salivation copious, and mixed with blood; eyes bloodshot and protruded; matter forms within the mammary glands, resulting in obliteration of one, or more, or all the quarters, and possibly total removal by mortification, during the process of which the lungs from irritative fever are seriously involved; the virus of gangrene is absorbed, prostration ensues, hoofs slough off, and with them bones, leaving the creature the alternative of a stump;

blood becomes impure, and doubly so from imperfect æration at the lungs; nervous power declines, which is succeeded by coma and death. In some cases suppuration takes place from large swellings in various parts of the body, as the shoulders, loins, hips, &c., from which the skin sloughs off, exposing deep vacant places in the muscles, and giving exit to large quantities of matter, and as tardy in their healing powers as in their previous maturation.

In Sheep the loss of condition is rapid, and early succeeded by thorough emaciation and prostration of the vital powers; mastication is retarded; locomotion all but an impossibility, from the tendency of the disease to be confined to the feet in its greatest intensity; the whole course is slow and retarded, rendering recovery in these animals of a very tedious, lengthened, and unsatisfactory nature, in a great measure resulting from the extreme difficulty in distributing the necessary minute attention to individuals comprising such large flocks in various parts of the kingdom, together with peculiar influences excited upon them by locality, and the effects of dirt, moisture, &c., &c., as irritants constantly applied, which perpetuate the existence of sores, and induce ulceration and sloughing. The poor creature moves upon his knees when required, and as disease assumes more and more the chronic form, serious losses result to the proprietor by the impediment thus set up against the practicability of restoring lost condition among such numbers. Suppuration proceeds slowly and obstinately; the feet are hot, and softer structures above raw and exquisitely sore; and at length the hoof is thrown off. If matters do not stop here, bones, tendons, and ligaments are exposed and sometimes sequestered, and fungoid granulations are pushed forward with a rapidity the most astonishing.

Pigs suffer much from irritative fever, and exhibit the symptoms much earlier than most other animals, with the unerring tendency to sloughing of the hoofs. Pain and lameness is early manifested by the screams emitted when required to move; profuse salivation and champing of the jaws indicate the vesicular eruption of the mouth, which is soon followed by ulceration; the appetite is absent; constipation gives way to diarrhœa; cough is present; rapid emaciation comes on, followed by speedy death. At times the skin over the body becomes red and irritable, being considerably elevated, swollen, and inflamed in the abdomen, and on the legs above the hoofs, which is succeeded by ulceration and sloughing if not early attended to. The disease exhibits all the characters of its contagious nature in these animals, and is particularly fatal to young ones—its putrid type being manifested in the rapidity with which the diseased surfaces run on to gangrena.

The fatality, however, has not been so great of late years in all animals, notwithstanding its prevalence—the general characters being much milder than formerly—the mortality, in a majority of instances, being confined to young or pregnant animals; in the latter case, particularly sows and ewes, when the cases of abortion are consequently frequent, and the state of the system so peculiarly susceptible to undue influences, that disease of a complicated nature is set up from which death results. Cattle are not exempt from these complicated additions to pathological states, which exert their powerful influences against a speedy recovery, or otherwise strengthen its virulence and fatal character.

As a rule, murrain can not unquestionably be called a fatal disease, apart from such conditions as have just been considered. Under ordinary circumstances, with proper attention, domestic and medical, it has proved of late more and more tractable in its general nature, deaths rarely resulting in adult cattle without one or other of the complications alluded to. It has, however, in the experience of the writer, not been the less contagious, being readily communicated to oxen, sheep, and pigs; neither has it been otherwise than prevalent, though probably not in such extreme degrees as formerly, being confined principally to districts where changes are frequently made, and fresh stock introduced from markets. In all cases save one which have come under the writer's observation, it has arisen from positive contagion; the exceptional instance not only baffled all attempts to prove its origin satisfactorily, but also somewhat tended to shake any perceived notions as to its positively contagious or infectious nature. The circumstances are as follow:—

About 60 head of cattle for feeding purposes were purchased in November, 1863, from a dealer who affirmed they were obtained from farmers in his immediate vicinity, and never been into a fair or market. They travelled a turnpike road for four or five miles, and afterwards bye roads, to their destination, passing several herds of cattle in the adjoining pastures on their way. On their arrival they were put into a large central pasture, where they remained for several weeks, till the weather proving wet, stormy, and cold, and keep scarce, when they were housed, and fed upon Swedes, oat and barley meal, with clover, hay, and cut chaff. The byre which received them had not been tenanted since a previous lot of fat cattle were sold in May previous, and no animals affected with disease of a contagious character had been in them for twelve years, when Vesicular aphtha had appeared mildly among the feeding cattle brought from Yarm fair. After the expiration of one month, when each animal had made considerable progress in condition, a heifer standing third from the entrance commenced to salivate and refuse her food, with other symptoms of Murrain; and as each animal could reach his or her fellow from the principle of tying up adopted, we naturally augured the existence of a scourge among the number. I should have stated that 20 of the number, when taken up from the pastures, were sent to a farm five miles distant eastward, and immediately tied up in a feeding byre. Ten were forwarded to another farm seven miles south, and placed in boxes, the remaining forty being left at the home farm, where our description began.

Further separation was impossible, and we accordingly prepared for the worst. Each animal was carefully examined; ventilation and cleanliness scrupulously attended to; soft, nutritious, and easily digested food supplied; and medical treatment, both preventive and remedial, judiciously carried out. The next day two bullocks at the furthest extremity of the building, at least 60 or 70 feet from the rest, and separated by several brick walls, were found to be affected. Next, the partner of the cow first affected was seized, and on the succeeding day another cow three or four distant. In all seven steers were seized, and about 14 cows and heifers at various intervals, extending up to the beginning of March 1864, the remaining nine never exhibiting the slightest symptoms, although tied side by side with those diseased, eating from the same box, and not unfrequently supplied with hay also refused by them.* One cow, in which thirst was excessive, was severely affected, and died from utter prostration caused by the alimentary canal being implicated, with profuse salivation, which amounted to several pails per day, and, strange to state, her companions on each side were not affected. In May 1864 the whole were sold, *all* in first rate condition—those in which the disease had appeared in nowise unequal to their more fortunate fellows.

In our desire to account for the appearance of the disease, although willing to make the most of improbabilities, we were placed in great difficulty, which has not been satisfactorily cleared up at the present moment. No disease of the kind was existing upon any neighbouring farm, nor has it occurred since within five miles. The home farm† is six miles from the nearest town, and more than twelve from the usual cattle market, and upwards of three from any turnpike road. Cattle are seldom seen driven along the contiguous lanes, except to the village butchers, which circumstance, coupled with the fact that the main line of railway passes within one field of the byre, are the only points upon which suspicion can rest, as it is well known that the butchers of the village use the market alluded to, and the railway also brings cattle from the same place and others, where murrain is well known to exist. If these facts demonstrate the cause of the outbreak, we have proofs of the delicate nature of the contagion of Vesicular Aphtha, and the facility with which it travels the atmosphere over considerable distances.

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* The reasonable solution to this proposition is that the animals had previously suffered from Vesicular Aphtha.

† Pensher home farm by Fence Houses—midway between Durham and Newcastle—belonged to Francis Anne, Marchioness of Londonderry.

Duration of the Disease.—In ordinary mild cases the fever subsides in four or five days, convalescence being restored about the fourteenth. The raw surfaces occasioned by the vesicles rapidly heal over, the animal being able to resume the ordinary food about the fifth or sixth day, when improvement visibly takes place, and in many instances much more rapidly than in animals which have not been affected.

In severe attacks, however, great variableness occurs; sometimes weeks, and even months elapse before recovery is firmly established, the resulting prostration and emaciation combining to render the rearing of animals through the coming winter a difficulty of no slight character. This variety prevailed to some extent in 1852-54-55, and also in 1864; but I have been enabled to trace its virulence in many instances to causes which are under control, such as a want of care in communication, cleanliness, ventilation, and treatment, domestic and otherwise, while other farmers, &c., scrupulous in such matters, although suffering from the contagion, have been exceedingly fortunate.

I have met with but one case of murrain in the horse, and that of a very mild character, arising from the animal being housed in the same byre, and side by side, with milch cows affected. The prevailing symptoms were sore throat and aphthous eruptions in the mouth, with febrile symptoms, loss of appetite, &c., but no vesicles appeared around the coronets. It is a common practice in some large towns, owing to the scarcity of accommodation, to keep the horses and ponies of dairymen in the cowhouses, a stall being set apart at one end. Pigs also are kept under similar circumstances, which have never failed to shew early symptoms of the disease, after introduction to the cattle; but in all cases which have come under my care similarly positioned, when pigs have always suffered, all horses, except the above, have escaped. I have known also persons affected with what they termed blisters on the tongue, while in attendance upon murrained cows; but in my estimation symptoms were required to constitute *bona fide* Aphtha.

Causes.—As far as these in their origin are concerned, we cannot go beyond mere hypothesis. Instances of spontaneous origin are very rare; but it is reasonably supposed that the extreme contagious nature of the disease may be propogated through the medium of the atmosphere, in common with other diseases of a like nature. The diseased animal products, which are so well known to be poisonous to healthy cattle, undoubtedly furnish the virus in an indefinite form; but in the majority of cases, where it has originated without known actual contact, the precaution of necessary care and attention, in more particulars than one, have been sadly deficient.

Being a disease in which the mucous membranes suffer extensively, and give rise to products of a highly contagious nature, and taking into consideration their great susceptibility to surrounding influences, their capability of absorbing matter in minute division, and to become rapidly diseased in such cases, there is every possibility that murrain may originate in some instances from defective housing, feeding, and want of proper attention to sanitary regulations. The most prevailing causes, however, at present may be traced to the travelling of diseased animals to fairs and markets, on roads, or in steamboats, railway trucks, subsequently used by healthy cattle. Hay, straw, grass, &c, conveyed from one farm to another, or exposed in markets for sale, probably may effect a transmission of the disease. Sheep, by their wool, game, dogs, &c., have also, in common with the clothes of individuals, been invested with a considerable amount of supposed power in its conveyance; and doubtless foreign cattle frequently bring it with them, having been landed during the incubatory stage, when actual symptoms were not present. Small farmers and dairymen who use markets for the saleand purchase of stock, particularly in the immediate vicinity of the writer, suffer from the effects of murrain, and also act as effective agents in propagating the disease by direct contagion.

Preventive and Remedial Treatment.

Of the former, it will be apparent that in consideration of the subtle nature of the disease, our first efforts should be directed towards arresting or limiting the means by which it is introduced and propagated among our stock. It is obvious also how feeble our efforts must be in this, as in all other conditions of a similar tendency, when the causes are of such imponderable characters, to circumscribe its disastious effects upon animals to whom it has been introduced. Results are often recognised only when irreparable mischief has been committed, the continued progress of disease certain—the whole herd without doubt infected. It is thus when ordinary measures, as isolation and fumigation, &c., are of no avail, the deterioration of stock goes on impeded, and in the absence of machinery of an elaborate and effective nature, I, for one, see but a poor reward for endeavours short of this as general means. The farmer and dairyman, by the exercise of great caution and attention to sanitary regulations, may greatly avert its occurrence among their stock, by introducing animals selected from healthy herds and localities; his purchases, when made in public markets, being confined to men of well-known honesty; and particularly when its introduction among mixed stock will affect his profits, so materially, a course of quarantine might be adopted with great advantage to ensure exemption from the incubatory stage. Farmers and others, who annually let off portions of their land, might also exercise rigid scrutiny against cattle to be introduced, and imported cattle, affected, or supposed to be so, detained until the crisis is past. The latter proceeding, I believe, is carried out in some, if not all, our large places of import, and I think with benefit, as the exporters are more alive to the necessity of forwarding cattle which are fully believed to be sound; but even under such rigid exertions at places of export, with short and rapid sea passages, and, as before observed, the subtle nature of the disease, all doubtless admits of animals being forwarded in which murrain is undergoing the incubatory stage, needing only such exciting causes as the crowding together upon the deck or in the hold of a ship to develope the whole train of symptoms.

Another aspect, in which, the disease and its consequences may be viewed, and also demands a consideration of the utmost importance, is involved in the proposition—"That it is best, in some instances, to solicit, and even obtain, this disease;" and for this purpose the subject of innoculation deserves a trial as treatment of a prophylactic character on the following grounds:—The most serious losses which occur from murrain do not arise from its fatality or malignancy as a general rule, but from the serious interruption to milking and fattening properties; therefore it should be our desire, if possible, to ensure our cattle having suffered from it prior to the period of their profit and usefulness arrives, more especially since we are aware that generally animals are not usually affected more than once during their lifetime, and that innoculation produces the disease in a modified or less severe form, and produces, as in other diseases of a like character, a greater insusceptibility to its more complicated forms. The peculiar nature of murrain particularly favours this proceeding, being easily communicated from one beast to another. One animal will infect a whole herd, and render quite unnecessary the process of an operation for its conveyance. Young cattle of all kinds, before being housed for their respective purposes, therefore, should be seen through the disease, either by being directly innoculated, or introduced to some isolated place to others under its effects, all proper domestic treatment being likewise carried out. One or two deaths at this time would not be so severely felt as the subsequent losses in milk or condition in greater numbers.

As with all diseases of similar origin and specific characteristics, all attempts to reduce its actions to the circumscribed limits of our powers and control should be made. Contagious diseases exert their baneful influences by the subtleness of their attack. The minute form and indefinite characters which pertain to their virus and tendency to such erratic and eccentric modes of action specially illustrate the great necessity for exertion to battle against them. For this purpose the principles of thorough ventilation should be carried out, with scrupulous cleanliness; the hands should be washed effectively before milking sound cattle after attendance on those diseased; but what is more desirable, complete separation and distinct attendance. The use of quick lime to the floors with M'Dougall's disinfecting powder, is a most efficacious remedy, which should be used also in whitewash for the walls. The disinfecting fluid, manufactured by the same individual, or that of Condy, Burnett, Ellerman, &c., are all more or less indispensable to arrest contagion, as applied to buildings, stall posts, &c., when fumigation cannot be applied. Chlorine or sulphurous acid water also are valuable remedies, and readily available for washing the floors, drains, &c. As a fumigation,[1] sulphur may be burned in the closed building, or chlorine gas set free from common salt in the usual way, when all cattle are removed.*

Remedial or curative treatment consists in allaying febrile symptoms by cooling salines, as sulphate of magnesia or soda—in the first instance to produce a laxative effect upon the digestive canal, from half a pound to one pound being required according to age and size. The mouth should be washed with astringent solutions, as alum water,[2] one or two drams to eight ounces of water, acidulated solulions,[3] chlorine water, &c.[4] Good food, nutritious gruel, hay tea,[5] good beds, dry houses, and great cleanliness, with friction to the skin when it can be borne, and clothing under exacerbations of fever, &c., will be found more or less useful and beneficial. Mild cases will require no other treatment scarcely—in fact many recover without—but in my opinion our attention should be directed to a course of proper treatment, with a view of paralysing the powers of the disease as much as possible.

In severe cases, however, as typhoid fever rapidly sets in, and almost from the first, depletive measures cannot be sustained beyond the first dose of laxative medicine, which should be compounded with vegetable tonics and aromatics,[6] followed by diffusible stimulants,[7] particularly when the temperature of the body is found to be low, and weakness present, and suppurative process tardy and slow, as an effect of prostration, &c.

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* Directions for the special application of these measures will be found at the end of this report.

All loose portions of hoof should be removed, together with those which favour the retention of matter; in some instances an opening should be made at the solar portion of the foot when matter burrows deeply; abscesses opened as early and as freely as possible, and poultices[8] to the feet, assisted by mild caustics,[9] to promote the healing powers. Strong caustics I have found to be highly prejudicial, especially in milch cows, by their unerring tendency to the increase of irritation or symptomatic fever. The various acids are highly useful, and may be used as hereafter directed, free or mixed with the poultice.

In those extreme cases, where abscesses form over various parts of the body, due attention must be paid to the state of the bowels, *ab initio*, succeeded by the early use of tonics and stimulants—iron with gentian being found highly useful, not only as a topical dressing to the mouth, but as an invigorating agent to the whole system. Liberal diet should be allowed as the patient will take it, but when the extreme soreness of the mouth precludes the possibility of doing so, demulcent drinks, and thick oatmeal and linseed gruel with treacle should be given with the horn, if the beast cannot take it, in which the iron and gentian[10] may be mixed. Hay tea forms a very agreeable drink, of which most animals will partake, and should be allowed *ad libitum*, when diarrhœa is not present or feared to come on. Ale, port wine, and various spirits are sometimes used, but their more useful counterparts may be obtained in the shape of ammonia, &c., with gruel and treacle, &c. Open the abscesses freely and as early as possible, after which keep them clean and treat as ordinary wounds. The zinc myrrh compositum, Tr. Arnica Montana, or white lotion of the Edinburgh Veterinary College, as prescribed by Professor Dick form very good compounds, the latter being the most efficacious. Should the healing process be tardy, and ulceration and sloughing probable, as indicated by a dry unhealthy appearance of the wounds, use the black oils, or spirits of camphor, turpentine liniment, &c.

In affections of the mammary gland, the teat syphon should be used to draw off the milk, and obviate the increase of soreness to the teats by milking. Weak solutions of carbonate of soda[11] injected up the teat of the affected quarter have proved highly successful in my hands, allaying the irritation arising from the retention and coagulation of milk, and neutralizing free acids which are formed within as a result of the resident inflammation. I have also found large doses internally of very great service in these affections, in conjunction with moderate depletive measures, which under these complications the animal will generally bear with much greater safety.

The hyposulphite of soda[12], and iodide of potassium[13] have been attended with marked benefit; and chlorine water, solutions of sulphate or chloride of zinc[14] to the broken vesicles upon the bag of great service also.

Abscesses forming in this part must also receive the earliest attention as previously recommended, noticing this difference—that suppuration, or the formation of matter, does not exhibit the usual characteristic signs of tumefaction and swelling in this organ as when taking place among muscles, &c.; but, on the contrary, is denoted by a depression, and sense of pitting under the finger; and mortification is likely to affect the whole or portion, therefore stronger remedies called digestive[15] are needed to promote a free discharge of matter to liberate the internal affected parts. Poultices cannot always be made use of to this organ—particularly under the affection we are considering; but, if possible, their effects for good will be found apparent.

In the first instance of disease seizing the udder the ointments of elder, camphor, mercury, or iodine, will be most beneficial; but not after inflammation has finally become developed.

As a rule bleeding has not generally been imperatively called for in my practice, the early approach of weakness forbidding it, depletive effects having been sufficiently accomplished by saline medicine.

When affections of the alimentary track appear, as indicated by sore cough, profuse salivation, diarrhœa, colic, &c., the hyposulphite of soda,[16] sulphate of magnesia or soda, with nitre, will be required, and demulcent drinks in small quantities. In urgent stages prussic acid,[17] aconite, hyoscyamus or belladonna, laudanum, with oil are highly useful in their various combinations. This form of disease with the latter complications considered, is the most fatal, producing death by the effects upon the lungs and nervous system. Our most energetic efforts, therefore, to stay the disease in its progress should be directed to the animal in the early stages, as prostration succeeds with such rapid strides, as to render all our efforts to rouse the dormant powers unavailing.

Affection of the lungs in cattle as an independent disease, under the denomination of pleuro-pneumonia, is always of a nature to be dreaded, but when dependent upon a combination of causes, and particularly in connection with such states of the system as I have described, the treatment will obviously be of a very hopeless character.

The vascular system in ruminants eminently favours the process of effusion within the inter-lobular spaces of the lungs, and cavity of the chest, which favours the general prostration already brought about; and counter treatment under such circumstances is often productive of greater harm. If the animal survives to some extent, consolidation, or hepatization of the lungs is safe to occur, with adhesions more or less to the sides.

The *post-mortem* appearances presented in animals which have died from the effects of murrain are rendered variable from the complications with which it now and then occurs. The most simple being that in which the animal dies from implication of the digestive organs, utter prostration from want of support, and the effects of profuse salivation being the immediate cause. The muscles of the body are pale, soft, and flaccid, and wasted, the secretions being diminished.

Bowels empty, with here and there patches of ecchymosis—internally the membrane is ulcerated extending from the mouth and fauces, to the small intestines, and even the rectum, the fourth stomach participating the most.

In milder cases, the third stomach I have found constipated, the mouth and gullet only being affected.

Extreme cases are marked in addition to the above by disorganisation of the lungs, liver, spleen, or altogether; congestion of the brain and medulla oblongata; the blood resembles treacle, and will not coagulate; patches of ecchymosis and inflammation here and there are found over the bowels.

The condition of pyæmia being in some cases established prior to death taking place, the tendency to early gangrene present, and rapid putrefaction ensuing, particularly in sheep and pigs.

MEASURES ADVOCATED IN THE FOREGOING PAGES, WITH DIRECTIONS FOR THEIR USE.

1. *Fumigation.*—For this purpose sulphur may be burned on a chafing dish of hot coals, red hot irons, &c., or chlorine gas evolved by pouring muriatic acid over the black oxide of manganese, and applying heat to the glass vessel in which the mixture is placed. Another process consists in using slightly diluted oil of vitriol; black oxide of manganese and common salt when the gas is rapidly evolved.

2. *Alum Water*, consists of two drams of powdered alum to 6 or 8 ounces of water.

3. *Acidulated Solutions.*—Sulphuric, nitric, or hydrochloric acids, in the proportion of half a dram to the ounce of water for the feet. For the mouth, 1 dram to 8 ounces.

4. *Chlorine Water* is made by directing a current of the gas from the retort or flask in which it is generated through a volume of water.

5. *Hay Tea* consists of a large handful of clover or other

sweet-smelling hay being covered by boiling water in a pail, which, after the lapse of ten or fifteen minutes, is filled up with cold water to the required temperature.

6. *Vegetable Tonics and Aromatics.*—Most useful are gentian and ginger pulverised, in dozes of 1 to 2 ounces.

7. *Diffusible Stimulants.*—Aromatic spirits of ammonia—dose, 1 to 2 ounces largely diluted; carbonate of ammonia, 4 drams do.; liq. ammonia, 1 ounce do.

8. *Poultices* are composed of linseed meal and brewers' yeast.

9. *Mild Caustics.*—See No 13 and No. 14.

10. *Iron and Gentian.*—Sulphate of iron, 2 drams; powdered gentian, 1 to 2 ounces.

11. *Solution of Carbonate of Soda.*—2 drams to 8 ounces of distilled water, as injections for the teats; as an internal remedy, 2 ounces in gruel or water two or three times a day.

12. *Hyposulphite, Sulphite, and Bi-sulphite of Sodium*—Internally, 2 to 4 ounces two or three times a day in water, gruel, &c.

13 *Iodide of Potassium.*—1 to 2 drams, as No 12.

14. *Sulphate of Zinc Solution*—10 grains to 1 ounce of water.
Chloride of *do.* 5 do. do.

15. *Digestives.*—As black oils; rape oil, 8 ounces; sulphuric acid, 1 ounce—mix cautiously; ointment of verdigris or acetate of copper; ointment of resin, &c.

16. *Hyposulphite of Sodium*—2 to 4 ounces two or three times a day; sulphate of magnesia or soda, 2 to 4 ounces three times a day.

Nitre.—Nitrate of potassium, 4 drams three times a day.

17. *Aconite*, Tincture of, 20 or 30 drops for a dose, ...
Prussic Acid—5 to 10 drops for a dose,
Hyoscyamus, Tincture of. 2 to 3 fluid ozs.
Belladonna, Extract, 1 to 2 drams, .
two or three times a day.

PROCEEDINGS OF THE CHEMICAL DEPARTMENT.

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I.—FIELD EXPERIMENTS ON THE ACTION OF URIC ACID AND GELATINE AS MANURES.

In the 11th volume of the Transactions of the Society, I published the results of a series of experiments on the action of uric acid as a manure, undertaken for the purpose of solving a doubt which had been expressed as to whether that substance is capable of affording a supply of nitrogen to the crop to which it is applied. The practical importance of determining this point lies in the fact that more than half the nitrogen in Peruvian guano is present in the form of uric acid; and if that substance cannot yield up its nitrogen to the plant, it is manifest that however good may have been the effect of that manure, the farmer who goes on the assumption that all its nitrogen is equally available as food for his crops, must have attached to it a greater value in proportion to other manures than it really merits.

It may be considered as a matter established beyond all doubt that complex nitrogenous compounds, such as those which form part of the tissues of plants and animals, are incapable of direct absorption into the vegetable system, but must first undergo decomposition, and yield up their nitrogen in the form either of ammonia or nitric acid before it can be assimilated; and it is very clear that however rich a substance may be in that element, it must be valueless in an agricultural point of view, unless it is capable of undergoing this change. It had been always assumed that uric acid was readily decomposed in the soil until Liebig recently called this opinion in question, and excluded its nitrogen from among the valuable constituents of Peruvian guano. I had myself always held an opposite opinion, and maintained that the nitrogen, not only of uric acid, but of all other nitrogenous compounds existing in manures, might be calculated as ammonia without entailing any practical error, and this certainly seems to be the fair and legitimate inference to be drawn from the observed results of the action of manures. But as a different opinion had been expressed, it appeared most desirable that both views should be submitted to the test of actual experiment, and I was thus induced to undertake the investigation which has been referred to at the outset. The results of these experiments, for the details of which I must refer to the paper itself, proved incontesibly that uric acid did act as a manure, and the general conclusion to be drawn from them was that, as a source of nitrogen, that substance was on the whole equal to sulphate of ammonia, a result which it is scarcely necessary to observe, could only be due to its rapid decomposition in the soil.

Although the experiments admitted of no other conclusion than that just referred to, it appeared very advisable to repeat them during another year, partly because the season in which they were made was an exceptional one, but still more, because I hold that no final or absolute conclusions should, in a science like agriculture, be drawn from a single series of experiments, however exact or successful they may be. I therefore gladly availed myself of the kindness of my friend, Mr R. J. Thomson, Grange, Kilmarnock, to whom my best thanks are due for the opportunity he has afforded me of again experimenting on the subject, and the trouble he has taken in securing a successful result. It was my wish that these experiments should have been repeated on turnips as well as cereals; but circumstances, to which it is unnecessary for me to advert, rendered this impracticable; and during the past year they were made on oats and hay.

Though thus restricted as to the crops, it was possible, so far to modify the experiments, as to make them embrace a somewhat wider field. The comparison of ammonia with uric acid is only a particular case of the more general question of the accessibility of nitrogen in different forms to the plant. If there be any truth in the idea that uric acid cannot decompose and yield up its nitrogen in forms available as plant food, it necessarily follows that those substances which do so must differ in manurial value, according to the facility and rapidity with which they undergo this change, and thus it would be necessary to establish by elaborate and frequently-repeated experiments the exact value to be attached to each nitrogenous compound. It would even be possible that some nitrogenous compounds may be of so inert a character as to be entirely incapable of decomposition in the soil, and although it is probable that such cases must be so rare as to be practically unimportant, it is quite an open question whether there may not be some whose decomposition is so tardy as to affect, to some extent, their value to the farmer. Bones, for example, contain no ready formed ammonia, but the gelatine, which forms in general about 35 per cent of their weight, yields it freely by decomposition, and though there is no doubt that sooner or later the whole of their nitrogen passes into the available form, still the question remains whether the necessity for this change taking place may not so far retard its action as to detract to a greater or less extent from its value to the farmer, and make it less suitable to his purposes than the ready-formed ammonia would be. The idea is at least a plausible one, and has been frequently put forward as a reason for preferring particular manures, and though there are no very good grounds on which it can be maintained, it seemed very desirable to have it submitted to experimental proof, and for this reason gelatine was added to the list of substances used during the past year.

The experiments were conducted in a manner similar to those of 1864, and were founded on the principle of starting from a definite quantity of nitrogen in its different forms; but, in place of using three separate proportions, and thus making three distinct series of experiments by which the inquiry was complicated without any proportionate advantages, one quantity only was employed, and in such proportion as to afford a supply of nitrogen equal to 56 lbs. of ammonia to the acre.

The substances used in the experiments were—

1. Peruvian guano; a sample of fair though not of very high quality, the composition of which was accurately determined after it had been reduced to fine powder, and thoroughly mixed. It contained—

Water,	15·89
Organic Matter and Ammoniacal Salts,	50·11
Phosphates,	22·50
Alkaline Salts,	10·04
Sand,	1·46
	100·00
Ammonia,	16·51
Phosphoric Acid in the Alkaline Salts equal to 5·89 of Phosphate of Lime,	2·85

2. The ash of Peruvian guano, prepared by burning it until it was nearly white.

3. Uric acid obtained by boiling Peruvian guano with hydrochloric acid, until all traces of ammonia were removed from it.

4. Glue. That used was the ordinary kind employed by carpenters, and was purchased in the thin cakes with which every one is familiar. Considerable difficulty was experienced in bringing it into a condition in which it could be applied to the land, for it was so tough that it was impossible to grind it in a mill. After several trials, however, it was found that by careful drying in a kiln for some time it became so brittle that it could be reduced by crushing and pounding to a powder, which, though rather coarse, was sufficiently fine for the purpose. It contained 13·36 per cent. of nitrogen, equivalent to 16·22 of ammonia.

5. Sulphate of ammonia. A very excellent example of the commercial article was employed.

The exact composition of all these substances having been determined by analysis, the first point required was to calculate the quantity of guano which must be used in order to supply to the soil nitrogen equal to 56 lbs. of ammonia. It amounted in this case to 338 lbs., and contained 115 lbs. of ash. Mixtures of guano ash, with uric acid, gelatine, and sulphate of ammonia, in such proportions as to yield in all cases the same amount of nitrogen as the Peruvian guano, were then made, so that there were thus obtained so many manures, identical in all respects, except in the form in which nitrogen existed in them. These mixtures were further contrasted with guano ash, uric acid, sulphate of ammonia, and gelatine applied alone.

The plots extended in every case to 1-112th of an acre, a quantity which presents great convenience in practice, and has proved well suited to the purpose. They were carefully measured off, and pins being fixed in the corners, galvanized iron wires were stretched between them, so as distinctly to mark off and separate each. Numerous nothing plots were interspersed between those to which the manures were applied.

EXPERIMENTS ON OATS.

These experiments were made by applying the manures as a top-dressing, and this was done on the 25th of May, when the land was in excellent condition. The rainfall during the month of May amounted to rather more than 3 inches, but the month of June was remarkably dry—only 1·100 inch having fallen during the first four weeks, as may be more particularly seen from the subjoined table of the rainfall during the continuance of the experiments:—

TABLE I. *Showing the amount of rain which fell on the experimental field during the months of June, July, August, and September*, 1865:—

Month.	Week ending.	Inches.
June, ...	7 ..	0·29
	14	0·01
	21	0·00
	28	0·80
July,	5	0·49
	12	0·75
	19	0·92
	26	0·06
August,	2	0·37
	9	0·06
	16	1·61
	23	0·55
	30	2·28
September,		1.02
	13	0.35
	Total, ..	9.56

In the course of a few days, all the plots to which manures containing nitrogen had been applied showed a very conspicuous improvement, but no difference could be detected between those which were purely nitrogenous and those which got guano-ash in addition. The plots which got guano-ash alone were entirely unaffected, and during the whole season remained completely on a par with the nothing plots. During the dry weather in June the sulphate of ammonia plots made greater progress than any of the others, and the superiority thus acquired was maintained during the whole of the season. After the fall of rain which took place in the end of July, the Peruvian guano plots got a-head of the uric acid and glue, and preserved this position when the grain was ripe. The crop was reaped on the 18th August, carried 8th September, and thrashed 29th September.

TABLE II. *Field Plan of the experiments on Oats, showing the position of the plots, the manures, and the amount of produce in lbs.:—*

SECTION I.		Nothing.	Peruvian Guano.	Uric Acid and Guano Ash.	Nothing.
	Grain, .	20½	29¾	29¾	20¼
	Straw, &c.,	33½	48¼	46¾	31¾
	Total,	54	78	76½	52
		Sulphate of Ammonia and Guano Ash.	Uric and Guano Ash.	Guano Ash.	Sulphate of Ammonia.
	Grain, .	32	29	19½	31¼
	Straw, &c.,	51	47½	32	48¾
	Total,	83	76½	51½	80
		Glue.	Nothing.	Nothing.	Uric Acid.
	Grain, .	28½	19	19	29½
	Straw, &c.	47½	32	31	46
	Total,	76	51	50	75½
SECTION II.		Nothing.	Uric Acid.	Glue.	Nothing.
	Grain, .	19½	29½	29	19¼
	Straw, &c.,	33	45½	43	30¾
	Total,	52½	75	72	50
		Sulphate of Ammonia.	Guano Ash.	Uric and Guano Ash.	Sulphate of Ammonia and Guano Ash.
	Grain, .	31½	20¼	28½	32
	Straw, &c.,	50½	33¼	44½	49
	Total,	82	53½	73	81
		Uric Acid and Guano Ash.	Nothing.	Nothing.	Peruvian Guano.
	Grain, .	28½	18¾	19¼	29½
	Straw, &c.,	45½	30¼	31¼	45½
	Total,	74	49	50½	75

In examining these results, it is at once apparent that the soil has been of a very uniform character, and extremely well adapted for experiment. The difference in the produce of the nothing plots is extremely trifling, and it is scarcely possible that this uniformity should be exceeded except under most exceptional circumstances. It is to be noted, however, that the produce slightly diminishes as we pass from the upper to the lower part of the plan, but this does not affect the accuracy of the results, any discrepancy which exists disappearing when the average of the different plots are taken. Along the middle of the plan, at the line of the junction of the two sections, there is, in fact, an average soil, and from the peculiar arrangement of the plots, those to which the same manure has been applied are always equidistant from it, so that if the produce of that in the first section is above the average, that in the second is as much below it; so that the mean of the two must give a perfectly exact result. This becomes still more apparent by reference to the next table, which gives the results calculated to the acre with the average of each pair of plots. The quarters and bushels of grain are calculated at the weight of 40 lbs. per bushel. The sum of grain and straw is also given in cwts. per acre, which admits of reference to the preceding table, because, from the particular size of plot adopted, pounds of produce in the field plan correspond to cwts. per acre.

TABLE III. *Giving the average produce of oats per acre, the grain in quarters, bushels, and pounds; the straw in tons and cwts.*

Manure.	Nothing						Peruvian Guano						acid and guano ash.					
Produce in	Grain			Straw		To	Grain.			Straw		To	Grain.			Straw		To
Measure.	Qrs.	Bu.	Lbs.	T	C	Ct.	Qrs.	Bu.	Lbs.	T	C.	Ct.	Qrs.	Bu.	Lbs	T	C	Ct.
Section 1st	7	1	16	1	13¼	54	10	3	12	2	8¼	78	10	3	12	2	6¾	76½
Section 2nd.	6	5	36	1	11¼	50½	10	2	24	2	5¼	75	9	7	32	2	5¾	74
Total.	13	7	12	3	4½	104½	20	5	36	4	13½	153	20	3	4	4	12½	150½
Average.	6	7	26	1	12¼	52¼	10	3	38	2	6¾	76½	10	1	22	2	6	75¼

Manure.	Nothing						Sulph ammonia and ash						Glue and ash.					
Produce in.	Grain.			Straw		To	Grain			Straw		To.	Grain			Straw		To
Measure.	Qrs.	Bu.	Lbs.	T	C	Ct	Qrs.	Bu.	Lbs	T	C	Ct.	Qrs	Bu	Lbs	T	C	Ct.
Section 1st	7	0	28	1	11¾	52	11	1	24	2	11	83	10	1	8	2	7¼	76¼
Section 2nd.	6	4	16	1	10¼	49	11	1	24	2	9	81	9	7	32	2	4¾	73
Total.	13	5	4	2	22	101	22	3	8	5	0	164	20	1	0	4	12	149¼
Average.	6	6	22	1	11	50½	11	1	24	2	10	82	10	0	20	2	6	74⅝

Manure.	P. Guano Ash.						Sulph. Ammonia.						Glue.					
Produce in	Grain.			Straw.		To.	Grain.			Straw.		To.	Grain.			Straw.		To.
Measure.	Qrs.	Bu.	Lbs.	T.	C.	Ct.	Qrs.	Bu.	Lbs.	T.	C.	Ct.	Qrs.	Bu.	Lbs.	T.	C.	Ct.
Section 1st.	6	6	24	1	12	51½	10	5	20	2	8¾	80	9	7	32	2	7½	76
Section 2nd.	7	0	28	1	13½	53½	11	0	8	2	10½	82	10	1	8	2	3	72
Total.	13	7	12	3	5½	105	21	5	28	4	19¼	162	20	1	0	4	10½	148
Average.	6	7	26	1	12¾	52½	10	6	34	2	9½	81	10	0	20	2	5¼	74

Manure.	Nothing.						Nothing.						Uric Acid.					
Produce in	Grain.			Straw.		To.	Grain.			Straw.		To.	Grain.			Straw.		To.
Measure.	Qrs.	Bu.	Lbs.	T.	C.	Ct.	Qrs.	Bu.	Lbs.	T.	C.	Ct.	Qrs.	Bu.	Lbs.	T.	C.	Ct.
Section 1st.	6	5	8	1	12	51	6	5	8	1	11	50	10	2	24	2	6	75½
Section 2nd.	6	5	36	1	10¾	50	6	6	24	1	13	52½	10	2	24	2	5¼	75
Total.	13	3	4	3	2¾	101	13	3	32	3	4	102½	20	5	8	4	11¼	150½
Average.	6	5	22	1	11⅜	50½	6	5	36	1	12	51¼	10	2	24	2	1⅝	75¼

In examining this table the point which most immediately attracts attention is the entire inefficacy of the Peruvian guano ash. When employed alone the produce is exactly the same as that from the nothing plots, and when mixed with uric acid and glue the result is also identical with that obtained, when those substances are used without it. Along with sulphate of ammonia, however, it does produce a slight increase in the produce, but it is so small as scarcely to merit notice. This result is of special interest when we call to mind the opinion of Liebig, that the farmers need only apply in his manures these substances which are found in the ash of his crops—an opinion not generally entertained by chemists, and which has been recently to some extent modified by the author himself. The ash of Peruvian guano contains all the constituents of the ash of plants, not, certainly, in the proportions required for a grain crop, and some of them in very small quantity; but still it would be expected that they should have produced some effect, while none was observed.

Wherever nitrogenous manures are applied, however, the effect is extremely marked, the produce being greatly increased, and that nearly to the same extent in all cases. They cannot, however, be described as quite equal, for glue stands lowest, then comes uric acid; Peruvian guano slightly exceeds it, and sulphate of ammonia gives a still higher increase, but the difference between the lowest and the highest only amounts to about 10 per cent. The best effect, therefore, is produced by the ready formed ammonia, and this result is precisely what might have been anticipated from the character of the season. It appears, from the table of the rainfall given in a preceding page, that after the manures were applied there was an unusual drought, continuing for several weeks; and it is clear that, from the extreme dryness of the soil, those decompositions by which the nitrogenous compounds yield ammonia either could not take place at all, or were at least greatly retarded, so that, during the whole of that period, their nitrogen was comparatively inaccessible, while the sulphate of ammonia of course yielded it to the plants as they required it. It was in fact at this time that the difference was most apparent, those plots which got the ready formed ammonia having at once taken a start in advance, and the advantage they gained at that time was maintained during the rest of the season. In connexion with this point it is curious also to notice the very trifling difference between the plots manured with uric acid and Peruvian guano. As the latter contains nearly half its nitrogen as ready formed ammonia, it would have been anticipated that its produce should have stood midway between the former and sulphate of ammonia, whereas it is scarcely increased. This is one of those anomalous results which we must expect sometimes to encounter in the pursuit of agricultural experiments.

EXPERIMENTS ON HAY.

The field on which this experiment was made had carried a crop of oats in 1864, and was sown out with one bushel each of Italian and Perennial Ryegrass seeds, and 2 lbs, each of cow grass, alsike, and red clovers. The crop having made considerable progress before the manures were ready, it was considered advisable to have it cut before they were applied. This was done on the 26th May, and the manures were sown on the following day on plots 1-112th of an acre, and surrounded with wires as in the oat experiments. The immediate effect of the applications was precisely the same as that which took place in the oat crop, the nitrogenous manures at once producing an effect, those containing sulphate of ammonia very distinctly taking precedence of the others, and this continued till the end of July, when the hay was in flower, and there is every probability, from its appearance, that, had the crop been cut at that time, the results would have been a complete counterpart of those given by the oats. Mr Thomson, however, thought it better to leave the crop standing, and to watch its progress from week to week in order to see what changes occurred. This was continued till the 11th September, by which time it was much more than fully ripe, the hay having shed its seed, and being quite dry and hard. The results are contained in the following table:—

TABLE IV.—*Field Plan of Experiments on Hay, showing the arrangement of the plots, and the produce in pounds of the hay mown on the 11th September.*

SECTION I.	Nothing. 32	P. Guano. 55	U. Acid & Ash. 54	Nothing. 32
	S. Am. & Ash. 61	Glue & Ash. 60	Ash. 48	S. Ammonia. 58
	Glue. 62	Nothing. 43	Nothing. 40	Uric Acid. 62
SECTION II.	Nothing. 42	Uric Acid. 64	Glue. 68	Nothing. 45
	S. Ammonia. 74	Ash. 57	Glue & Ash. 73	S. Am. & Ash. 76
	U. Acid & Ash. 78	Nothing. 52	Nothing. 54	Peruv. Guano. 79

The field on which this experiment was made had a considerable slope, and, as often happens in that case, the quality of the soil was not uniform. The Nothing plots indicate very distinctly the increase in the produce from above downwards, but the arrangement is such that the duplicate results correct one another, the produce of one plot from each manure being as much above the average as the other is below it. This is obvious from the next table, which gives the results per acre, and in which, owing to the size of plot adopted, the numbers which stand for lbs. in the field plan represent cwts.

TABLE V.—*Showing the average produce of Hay per acre in cwts.*

Manure.	Nothing.	Peruv Guano	U Acid and Guano Ash	Nothing.	S of Ammonia & Guano Ash.	Glue & Guano Ash.	Guano Ash.	S of Ammonia.	Glue.	Nothing.	Nothing.	Uric Acid
Section 1st, Section 2nd,	32 54	55 79	54 78	32 52	61 76	60 73	48 57	58 74	62 68	43 45	40 42	62 64
Total,	86	134	132	84	137	133	105	132	130	88	82	126
Average,	43	67	66	42	68½	66½	52½	66	65	44	41	63

The results obtained in this case are somewhat different from those observed in the oats. Guano Ash, which there proved useless, has here produced a perceptible effect, having raised the produce from 42 (the average of the nothing plots) to 52½ cwt. This appears to be due to the irregular growth of the clover; for towards the end of August it was observed that the proportion of clover on the Peruvian guano plots, and on the sulphate of ammonia, glue, and uric acid plots, to which guano ash had been added, was decidedly less than the normal amount; on those plots where the nitrogenous manures were used *without* the guano ash the clover had almost entirely disappeared, while it was increased to a very marked extent where guano ash alone was applied. It is difficult to explain how this should be, but there can be no doubt that the effect of the ash must be attributed to this; for, as far as the eye could judge, it had no effect whatever upon the ryegrass. With this exception, the results are similar to those of the oats, the ready formed ammonia taking the highest place, though the difference between it and the others is but small. Sulphate of ammonia and guano ash stands highest, and is followed by Peruvian guano, glue and ash, and uric acid and ash, in the order now stated, and the yield of the first exceeds that of the second by about 2 per cent, the second surpasses the third by nearly ¾ per cent., and there is about the same difference between the third and the fourth. These variations are very trifling, and undoubtedly find their explanation in the dryness of the season, and the imperfect decomposition of the nitrogenous compounds, occasioned by want of moisture, and it seems probable that they would not have been observed in an ordinary year, but that all would have produced the same effect.

The conclusions to be drawn from these experiments are very obvious. They completely bear out those of the last season, and prove incontestably that uric acid acts as a manure, and is scarcely if at all inferior to the ready formed ammonia. In last year's experiments the effect produced on turnips by sulphate of ammonia was somewhat superior to that of uric acid, and I attributed this to the late period at which the turnips were sown, and the dryness of the season, which was quite exceptional. Unfortunately the same meteorological peculiarities have manifested themselves this year, and the effect on the action of the manures has been of a similar character. The difference between them, however, is far from considerable; and it is worthy of notice that the effect of the dry season is not confined to the uric acid, but shows itself quite as distinctly with gelatine, regarding the value of which as a manure no doubt can exist.

The entire absence of manurial effect from the application of the mineral constituents of Peruvian guano, as applied to the cereals, is particularly worthy of notice, and raises a question of much practical importance. For some years back Peruvian guano has been largely used as a top dressing for cereals, and particularly for oats, in spring, and is by many persons believed to be the most economical way of using that manure; but if, as these experiments lead us to conclude, it acts by virtue of its nitrogenous constituents alone, its mineral matters are so much valuable matter which is either lost or fails to make any return until a later period. Now, in buying a ton of Peruvian guano at £13, the farmer pays £10 10s. for the ammonia (reckoning all its nitrogen in that form) which it contains, and £2 10s. for its mineral matters; and if the latter is to produce no immediate effect, it would in all probability be better for him to expend his money on sulphate of ammonia, because he can obtain for £10 10s. a quantity of that salt sufficient to yield the same quantity of ammonia as a ton of guano.

In addition to the conclusions to which they lead regarding the questions originally proposed for solution, these experiments offer an interesting illustration of the advantages attending the use of small plots, on which I insisted very strongly in my address on "Experimental Agriculture" at the Stirling Show. It would, in fact, have been scarcely possible to make such experiments on the ordinary quantities of ½ or even ¼ of an acre. The preparation of uric acid, free from ammonia, even for the small plots to which it was applied, was a sufficiently laborious and troublesome process. The cost of the materials required to produce a ton of uric acid amounted to about £80, to which the cost of manufacture would have to be added, but this process was conducted in the laboratory, and cannot be exactly estimated; I have little doubt, however, that, had a manufacturer been employed to make it, the price would not have been much under £100 a-ton. The guano ash cost about £40 a-ton, so that it is sufficiently obvious that these experiments, if conducted on a larger scale, would have been so costly as to have deterred any one from attempting them.

They show also the utility of interspersing numerous nothing plots among those to which the manures are applied, and the facility which this affords for detecting variation in the quality of the soil. This is remarkably seen in the experiments in oats, where a difference so trifling as to be scarcely deserving of notice, is made distinctly manifest. In the hay experiments, where the variation is larger, the multiplication of nothing plots gives the most conclusive evidence that the mean of the duplicate plots is the true average, and thus enables us to draw our conclusions with much greater confidence than could otherwise be possible.

In many other respects, also, the advantages of small experiments become obvious, and I am satisfied that, so soon as experimenters have had practical experience of the economy of time and money, coupled with the precision they offer, that for all ordinary purposes large experiments will be abandoned.

II.—ON THE COMPOSITION OF THE BEAN PLANT AT DIFFERENT PERIODS OF ITS GROWTH.

The researches contained in the following pages form part of an extensive series of inquiries which have occupied my attention for some years, and have for their object the investigation of the different agricultural plants at successive periods of their growth, and of which the results for the turnip and wheat crops have already appeared in the 9th and 10th volumes of the Transactions. Such inquiries are necessary to fix some of the great fundamental facts of scientific agriculture. They afford information regarding the period of active growth, the time when valuable matters are most rapidly absorbed from the soil and the air, their distribution through the different organs of the plant, and the proportions in which they are contained in it when it has reached maturity. All these are facts from which most important inferences may be drawn as to the time and quantity in which manures should be applied to these crops, and which throw light on many other important practical questions. In the papers already referred to, I have pointed out some of the bearings of these inquiries, and it will not be necessary to enter upon their consideration at the present moment; but, as an illustration of the nature of the facts which are brought out, it may be mentioned that the investigation of the wheat crop has shown, that contrary to the received opinion, the active growth of that plant is really confined within a very limited period of time, and indicate the importance of assisting its rapid growth by the application of manures at a somewhat advanced period of the season.

The bean plants which formed the subject of examination were grown in the year 1864, at Grange, Kilmarnock, on a reddish brown clay loam, of about 12 inches deep, resting on a subsoil of yellow clay, containing many small trap boulders, and having a thin stratum of moss about four feet down. The field bore mangold in 1862, wheat in 1863, and being in a high state of cultivation, no manure of any kind was applied to the bean crop, as it was feared that the straw might be over-luxuriant. The variety of bean used was the common Scotch or "horse" bean, and they were sown on the 21st April. During the early part of the season the plants made good progress, and gave promise of a fine crop; but, during the autumn, the weather in Ayrshire proved most unfavourable to the bean, and it was not till the beginning of November that the produce was harvested, and it was then found to be under the average in quantity, and very inferior in quality.

As soon as the plants had attained a sufficient height to admit of its being done conveniently, the number growing on a fraction of an acre was carefully counted, and was found to amount to 100,125 per acre. As this differs very little from 100,000, this round number was assumed as the actual produce, as it involved no appreciable error, and greatly facilitated the calculations, which are tedious and troublesome.

On the first of each month, commencing in June, a number of the plants were carefully pulled up, the soil shaken from their roots, and at once packed in a large tin box, with close-fitting lid, made expressly for containing them, and in which they could be conveyed to the laboratory without risk of losing moisture, a precaution which was very necessary, as, in consequence of their being conveyed some distance by railway, nearly 24 hours generally elapsed before they came into my hands. The arrangement was perfectly successful; in fact, the dew still lay on the leaves when the samples reached me. As soon as they were received, the plants were carefully separated, and wiped with a soft cloth. One hundred average plants were then taken and divided into their separate parts. The roots were separated, washed, and dried, so as to remove as thoroughly as possible the soil which adhered to them; the leaves, stems, and other parts were then weighed, and small portions carefully selected, so as to give a fair average of the whole, were weighed out and set to dry, at 212°, in the water bath, for the per centage of moisture. The remainder was spread out on a net placed in a moderately warm place, with free access of air, and when sufficiently dry, was burned in a platinum basin, to obtain the large quantity of ash required for its complete analysis. The residue, dried at 212°, was used for the estimation of nitrogen and the per centage of ash. All these determinations were made in the usual manner, and do not call for any particular notice.

1*st Stage*, 1*st June*, 1864.

At this period the plants had attained an average length, including roots, of about 10 inches. The stem was soft, and from 4 to 6 leaves, with small buds at the upper part, had been produced. The seed bean still adhered to the roots, but had shrivelled up; and, in some cases, little more than the outer skin remained. They were, however, separated and weighed. One hundred plants gave the following weights in grains:—

Roots	3147
Stalks	2135
Leaves	4319
Seed beans	812
	10413

The total produce per acre at this period amounts to 1487·57 lbs., which is divided between leaves, &c., in the following proportions :—

	lbs
Roots	449·57
Stalks	305 00
Leaves	517·00
Seed beans	116·00

The separate analysis of these organs gave the subjoined numbers :—

	Roots.	Stalks.	Leaves.	Beans.
Water	92·14	86·21	88·21	78·93
Albuminous compounds	2·18	3·18	4·06	20·20*
Other organic matters	4·72	9·06	6 54	
Ash	0·96	1·55	1·19	1·27
	100·00	100·00	100·00	100·00
Nitrogen	0·35	0·51	0·69	——

The same numbers calculated on the dry matter—

	Roots.	Stalks.	Leaves.	Beans.
Albuminous compounds	28·37	23·31	34·36	94·05
Other organic matters	59·83	65·29	55·30	
Ash	12·30	11·30	10·14	5·95
	100·00	100 00	100·00	100·00
Nitrogen	4·54	3·73	5·53	——

From these results the weight in pounds per acre of the different constituents of the produce are calculated in the following table :—

	Roots.	Stalks.	Leaves.	Seed beans.	Total.
Water	414·23	262·94	544·25	91·09	1312·51
Albuminous compounds	9·80	9·69	25·05	23·71	44·54
Other organic matters	21·22	27·63	40·35		112·91†
Ash	4·32	4·74	7·35	1·20	17·61
Nitrogen	1·57	1·55	4·61	——	7·13

In examining into the detailed composition of the mineral constituents of the plants, it was found that no results of value could be obtained from the analysis of the ash of the roots; because, however carefully they were washed, it was impossible to free them entirely from soil without injuring them. The analysis was therefore confined to the leaves and stems, the roots being separated at the point of junction. At this stage the leaves and stems were burned and analysed together, but the seed beans were examined separately, as it seemed probable that the composition of their ash, compared with that of the ripe produce, might show some interesting points of difference. The results were—

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* In consequence of an accident, and failure of material, it was impossible to make a determination of nitrogen in this case, and the whole organic matters are therefore stated together.

† This number includes the albuminous compounds of the seed beans, which were not separately determined. Their proportion, however, could not have been large, and the error involved by adding them to the other organic matters of the entire produce is unimportant.

	Entire plants without roots.	Beans.
Peroxide of Iron	3·14	3·03
Lime	25·01	24·21
Magnesia	3·20	3·18
Chloride of Sodium	8·47	4·18
Soda	1·42	5·59
Potash	3·99	2·19
Sulphuric Acid	6·24	3·04
Phosphoric Acid	6·08	6·51
Silicic Acid	6·49	2·28
Carbonic Acid	22·76	20·51
Sand	13·20	23·86
Charcoal	——	2·27
	100·00	100·85

These results, calculated after deduction of sand, carbonic acid, and charcoal, give—

Peroxide of Iron	4·90	5·58
Lime	39·07	44·67
Magnesia	4·99	5·86
Chloride of Sodium	13·23	7·71
Soda	2·21	10·31
Potash	6·23	4·04
Sulphuric Acid	9·74	5·61
Phosphoric Acid	9·49	12·01
Silicic Acid	10·14	4·21
	100·00	100·00

From these analyses it appears that the total quantities of substances contained in the crop growing on an acre of land amounts to the following numbers in pounds avoirdupois:—

Water	807·19	91·09
Albuminous compounds	34·74	23·71
Other organic matters	67·98	
Peroxide of Iron	0·49	0·047
Lime	3·92	0·372
Magnesia	0·50	0·048
Chloride of Sodium	1·32	0·064
Soda	0·22	0·086
Potash	0·62	0·034
Sulphuric Acid	0·98	0·046
Phosphoric Acid	0·95	0·101
Silicic Acid	1·02	0·035
Total	919·93	115·630
Nitrogen	5·56	——
Total ash	10·02	0·833

It is to be particularly noticed that the total quantity of ash here given does not correspond with that got by adding together the amounts given under the separate parts of the plants; and the reason for this is that the latter include the sand adhering mechanically to the surface, which is excluded from the former, as it is intended to embrace only those substances which really form a part of the tissues of the plant. The point most worthy of observation is the comparatively small quantity of mineral matter which the bean contains at this stage of its existence It amounts, exclusive of roots, to only 10 lbs., and of this, less than one pound consists of phosphoric acid, and about two-thirds of a pound of potash. Lime, however, is comparatively abundant, amounting to 4 lbs., so that even at this period the bean has acquired the right to be distinguished as a lime plant. It is probable that at this early stage of its existence the bean has drawn little, if at all, on the resources of the soil, for the seed must have contained a sufficiency of mineral matters to supply most of that the produce contained. Unfortunately, I am not in a condition to offer any decided proof of this, from not having had an opportunity of analysing the beans used for seed, no sample of them having been preserved. We may, however, form an approximative estimate from the known composition of beans. A bean weighs on the average from nine to ten grains, so that the 100,000 beans which germinated must have weighed about 950,000 grains, or 130 lbs., and have contained about 4·5 lbs. of mineral matter, nearly half of which must have consisted of potash and a fourth of phosphoric acid. The produce, therefore, actually contains less of these particular elements than the seed did; and as far as they are concerned the plant may be said to have been independent of the soil. It is otherwise, however, with lime, of which the seeds could not have contained more than 1 or 1·5 lbs., so that a very large proportion of that contained in the produce must have been derived from the soil. And in this we find an illustration of that remarkable provision of nature, by which, whatever may be the nature of the constituents of the growing plant, potash and phosphoric acid are those most abundantly stored up in the seed, and this is, no doubt, because these substances are intimately bound up with the first changes occurring in the germinating plant, while lime is of secondary importance, and not required, or, at least, not in large quantity, until the leaves and stems in which it is most abundant, begin to be developed.

2nd Stage, 1st July, 1864.

During the month of June the plants made steady, but not rapid, progress, and by the 1st of July had attained an average height of 18 inches. The leaves, of course, had greatly increased in number and size; and though the plants had not doubled in height, their weight had increased more than six-fold. The seed bean had disappeared from the roots, with the exception of a few remains too trifling to merit notice. The flowers had begun to make their appearance, and though few were expanded, they and the buds were separated from the plants, and separately weighed and analysed. One hundred plants weighed in grains—

Roots, ...	19,650
Stalks, ...	23,400
Leaves, ...	21,800
Flowers, ...	3,002
	67,852

The total produce per acre is 9692·8 lbs., which is thus distributed among the different parts of the plants:—

Roots, ...	2807·14
Stalks, ...	3342·85
Leaves, ...	3114·28
Flowers, ...	428·57
	9692·84

The composition of each of these parts was as follows:—

	Roots.	Stalks.	Leaves.	Flowers.
Water, ...	87·92	86·17	88·94	88·74
Albuminous compounds,	2·75	3·18	4·75	4·67
Other organic matters,	8·32	9·08	5·18	5·64
Ash, . .	1·01	1·57	1·13	0·75
	100·00	100·00	100·00	100·00
Nitrogen, ...	0·44	0·51	0·76	0·78

The same calculated in the dry state gives:—

	Roots.	Stalks.	Leaves.	Flowers.
Albuminous compounds,	22·75	23·57	37·43	43·43
Other organic matters,	68·85	65·03	53·32	47·92
Ash, . ..	8·40	11·40	10·25	8·65
	100·00	100·00	100·00	100·00
Nitrogen, ...	3·64	3·74	5·99	6·95

And the weight in lbs. of the different constituents per acre, calculated from these numbers, is as follows:—

	Roots.	Stalks.	Leaves.	Flowers.	Total.
Water, ...	2468·05	2880·53	2769·84	380·31	8198·73
Albuminous compounds,	77·18	186·30	147·87	20·87	352·22
Other organic matter,	233·56	308·07	167·00	24·17	732·80
Ash, ...	28·35	47·95	29·57	3·22	109·09
Nitrogen, ...	12·35	17·04	23·66	3·34	56·39

In the analysis of the ash, in this as in all subsequent stages, the roots were excluded, as it was found quite impossible to separate the particles of soil adhering to them; and the whole of the flowers on the plants used for analysis did not give a sufficient quantity of ash to admit of its being separately examined.

It was therefore included along with the leaves, so that separate analyses of stalks and leaves, including flowers, were made.

	Stalks.	Leaves and Flowers.
Peroxide of Iron,	3·34	2·86
Lime,	16·28	19·10
Magnesia,	4·57	3·88
Chloride of Sodium,	13·15	9·88
Soda,	11·92	7·52
Potash,	8·66	7·96
Sulphuric Acid,	5·28	5·93
Phosphoric Acid,	13·33	8·79
Silicic Acid,	3·38	6·80
Carbonic Acid,	15·88	15·98
Sand,	4·60	11·30
	100·39	100·00

And these numbers, re-calculated, after deduction of sand and carbonic acid, gave—

Peroxide of Iron,	4·18	3·94
Lime,	20·31	26·26
Magnesia,	5·72	5·33
Chloride of Sodium,	16·44	13·58
Soda,	14·91	10·35
Potash,	10·82	10·94
Sulphuric Acid,	6·73	8·15
Phosphoric Acid,	16·66	12·09
Silicic Acid,	4·23	9·36
	100·00	100·00

The total quantity in lbs. of the valuable matters contained in the crop from an acre of land, exclusive of roots, was now:—

	Stalks.	Leaves and Flowers.
Water,	2880·53	2769·84
Albuminous compounds,	106·30	147·84
Other organic matters,	308·07	167·00
Peroxide of Iron,	1·92	1·00
Lime,	9·33	6·73
Magnesia,	2·59	1·36
Chloride of Sodium,	7·47	3·48
Soda,	6·76	2·64
Potash,	4·91	2·80
Sulphuric Acid,	2·09	2·09
Phosphoric Acid,	7·57	3·09
Silicic Acid,	1·92	2·39
Total,	3340·36	3110·29
Nitrogen,	17·04	23·66
Total ash,	45·46	25·58

During the month of June it thus appears that the plants, while increasing in size, had undergone scarcely any change in composition, for the analyses of the stalks and leaves in this stage are practically identical with those of the previous period. In fact, had the leaves of the same stage been twice analysed, the probability is that differences quite equal to those between the two periods would have been observed. The roots, however, have changed in composition, and have become much more similar to the stalks than they were before. Leaves and flowers are also identical in composition, except that the latter contained a somewhat smaller quantity of ash. The mineral matters have also undergone some curious changes. Thus the absorption of lime has scarcely been so rapid as in the former stage, for while the weight of the plants has increased more than six-fold, that of lime is only four times as large as it was on the 1st June. On the other hand the absorption of potash and phosphoric acid has been exceedingly rapid, the quantity of the former being twelve, and of the latter ten times as large as it was before. The increased amount of soda both as such, and in the state of chloride of sodium, is also very remarkable.

3rd Stage, 1st August, 1864.

During this period the progress of the plants was very rapid, for they advanced from 18 inches to an average height of 37 inches, and increased to three times their previous weight. The flowers were now fully developed, and a number of pods about an inch to two inches in length had begun to form. These were separated and weighed apart, and the results for a hundred plants were in grains :—

Roots,	23,000
Stalks,	107,000
Leaves,	67,000
Flowers,	9,100
Pods,	5,050
	211,150

The weight per acre of the produce at this stage was, therefore, in lbs. :—

Roots,	3,285·71
Stalks,	15,287·14
Leaves,	9,428·57
Flowers,	1,300·00
Pods,	721·43

The per centage composition of each of these parts was :—

	Roots.	Stalks.	Leaves.	Flowers.	Pods.
Water,	83·14	88·24	87·24	90·96	90·66
Albuminous compounds,	2·37	2·68	5·86	2·93	4·06
Other organic matters,	12·94	7.92	6·30	5·38	4·37
Ash,	1·55	1·16	1·40	0·73	0·91
	100·00	100·00	100·00	100·00	100·00
Nitrogen,	0·38	0·43	0·81	0·47	0·65

And when calculated in the dry state :—

Albuminous compounds,	14·12	22·75	40·12	32·50	43·43
Other organic matters,	76·68	67·36	48·88	59·36	56·72
Ash,	9·20	9·90	11·00	8·15	9·85
	100·00	100·00	100·00	100·00	100·00
Nitrogen,	2·26	3·64	6·42	5·20	6·95

From this is calculated the weight per acre of each of these constituents contained in the different parts of the plant, which is as follows :—

	Roots.	Stalks.	Leaves.	Flowers.	Pods.	Total.
Water,	2,731·74	13,489·37	8,225·48	1,182·48	654·06	26,283·13
Albuminous compounds,	77·87	409·69	477.08	38·18	29·29	1,032·11
Other organic matters,	425·17	1,239·34	602·15	69·88	31·52	2,368·06
Ash,	50·93	148·74	123·86	9·49	6·56	339·58
Nitrogen,	11·88	65·73	76·37	6·11	4·69	164·78

In this stage as during the last, the weight of the flowers and pods was too small to admit of a complete analysis of their ash. They were, therefore mixed with the leaves, and the whole burnt, so that we have again the analysis of the ash in two parts; stalks and leaves including flowers and pods. The results were :—

	Stalks.	Leaves, &c.
Peroxide of Iron,	6·64	9·79
Lime,	11·59	17·16
Magnesia,	3·62	4·80
Chloride of Sodium,	13·51	6·92
Soda,	19·07	3·84
Potash,	6·31	6·58
Sulphuric Acid,	4·41	5·80
Phosphoric Acid,	12·95	7·29
Silicic Acid,	2·50	1·41
Carbonic Acid,	16·83	6·21
Sand,	1·44	30·51
Charcoal,	1·96	1·16
	100·83	101·57

And after deduction of carbonic acid, sand, and charcoal, these gave :—

Peroxide of Iron,	8·23	15·39
Lime,	14·38	26·98
Magnesia,	4·49	7·55
Chloride of Sodium,	16·76	10·88
Soda,	23·66	6·04
Potash,	7·84	10·35
Sulphuric Acid,	5·47	9·12
Phosphoric Acid,	16·07	11·46
Silicic Acid,	3·10	2·23
	100·00	100·00

The crop, exclusive of roots, had now stored up within it, the following quantities of mineral and organic substances :—

	Stalks	Leaves, &c
Water,	13,489·37	8225·48
Albuminous compounds,	409·69	477·08
Other organic matters,	1,239·34	602·15
Peroxide of Iron,	12·04	12·88
Lime,	21·03	22·58
Magnesia,	5·56	6·31
Chloride of Sodium,	24·49	9·09
Soda,	34·67	5·05
Potash,	11·44	8·65
Sulphuric acid,	7·99	7·62
Phosphoric acid,	23·50	9·59
Silicic acid,	4·41	1·85
	15,284·53	9388·33
Nitrogen,	65·73	76·37
Total ash,	146·13	83·62

On comparing the results of these analyses with those of the previous stage, a perceptible change is apparent in the composition of the stalks and leaves. The per centage of water contained in the former has somewhat increased, and that of albuminous matters has diminished; while in the latter the water is unchanged, and the albuminous substances have increased. We shall see that, in the subsequent stages, a further change in the same direction takes place. The flowers also have changed in a still more striking manner, the albuminous matters having fallen to little more than half what they were in the second stage. This change is no doubt due to the fact that, at the former period, the greater part of them were undeveloped—mere buds, in fact—in which the calyx, or outer green part, was large when compared with the corolla or coloured portion; and as the former resembles the leaf in its functions, it no doubt approaches to it in composition also. In the third stage, however, the corolla being fully developed, it has a proportionate influence on the composition of the whole. The imperfectly developed pods, again, while containing as much water as the flowers, are far richer in albuminous compounds, and there is thus evidence of the commencing transference of these substances towards that part of the plant in which the seed is formed, in order to furnish it with the large supply of them which it requires.

The composition of the ash at this stage does not call for any special remark, except in regard to the amount of peroxide of iron, which is higher than at any previous or subsequent period, especially in the stalks. The excess is so large that I was led to suspect some error might have occurred, but this is not the case, for there was no inaccuracy in the analysis; and all that can be said is that, owing to the discrepancy between the amount of that compound found at this and the other stages, the result must be open to doubt. Fortunately peroxide of iron is a substance of minor importance, in a practical point of view, and the discrepancy in it is of comparatively little moment. The quantities of all the other mineral matters at this stage are nearly proportionate to the weight of the plants. They have increased to about three times their previous weight, and the addition to each of the inorganic elements is nearly in the same proportion.

4th Stage, 1st September, 1864.

The progress of the crop during this stage was much less rapid than in the previous one. The weather was unfavourable, and accordingly we find that the plants had attained a height of 43 inches only—being an increase of 6 inches in place of 19, which they gained between 1st July and 1st August. The flowers had entirely disappeared, while the pods had made great progress, and the beans had in some cases begun to form within them. The increase in weight of the crop was almost entirely confined to the stalks and pods—the former weighing a half more than they did at the 1st August, and the latter about eleven times as much. The leaves had somewhat diminished in weight, a few of them having begun to decay. A hundred plants now weighed in grains :—

Roots, ...	24,500
Stalks, ...	155,840
Leaves, ...	61,440
Pods, ...	58,000
	299,740

Or in lbs. per acre :—

Roots, ...	3,500·00
Stalks, ...	22,265·71
Leaves, ...	8,777·14
Pods, ...	8,285·71
	42,828·56

The proximate analysis gave—

	Roots.	Stalks.	Leaves.	Pods.
Water, ...	80·56	85·02	87·17	87·97
Albuminous compounds,	2·87	2·06	5·31	3·75
Other organic matters,	15·13	12·22	6·34	7·61
Ash, ...	1·44	0·70	1·18	0·67
	100·00	100·00	100·00	100·00
Nitrogen, ...	0·46	0·33	0·85	0·60

And the same, when calculated dry, gave—

Albuminous compounds,	15·00	14·00	41·43	31·37
Other organic matters,	77·55	81·30	49·37	62·98
Ash, . .	7·45	4·70	9·20	5·65
	100·00	100·00	100·00	100·00
Nitrogen,	2·40	2·24	6·63	5·02

The weight of the different constituents in lbs., per acre, was—

	Roots.	Stalks	Leaves	Pods	Total
Water, .	2819·60	18,930·31	7651·04	7288 94	36,689·89
Albuminous compounds,	100·45	459·22	466·06	310·71	1336·44
Other organic matters,	529·55	2746·87	572·49	634·88	4483·79
Ash,	50·40	129·31	87·55	51·18	318·44
Nitrogen,	16·10	73·47	74 60	49·71	213·88

At this stage the pods had so greatly increased in weight that it was possible to make a separate analysis of their ash. The results of the ash analyses were—

	Stalks.	Leaves.	Pods.
Peroxide of Iron,	1·38	7·23	2·09
Lime,	19·52	18·48	15 00
Magnesia,	3·45	3·70	3·74
Chloride of Sodium,	11·35	5·27	10·21
Soda,	20·75	7·15	6·49
Potash ..	3·92	5·96	16 95
Sulphuric Acid,	4·77	4·83	26·23
Phosphoric Acid,	12·15	7·76	22·26
Silicic Acid,	1·91	3·40	1·21
Carbonic Acid,	17·04	15·26	7 53
Sand,	3·34	19·01	4·65
Charcoal,	0·75	1·59	4·15
	100·33	100·24	100·51

And calculated after deduction of sand, charcoal, and carbonic acid, the following numbers are obtained :—

Peroxide of Iron,	1·73	11·23	2·48
Lime,	24·68	29·87	17·32
Magnesia, .	4·35	5·80	4·44
Chloride of Sodium,	14·33	8·26	12·13
Soda,	26·20	11·21	7·71
Potash,	4·94	9·34	20·13
Sulphuric Acid,	6 02	7·59	7·40
Phosphoric Acid,	15·34	12·17	26.44
Silicic Acid, .	2·41	5·33	1·45
	100·00	100·00	100·00

The total quantity in lbs. of matters removed from an acre (exclusive of roots) was now—

	[illegible]	Leaves.	Pods.
Water,	18,930·31	7651·04	7288·94
Albuminous compounds,	459·22	466·06	310·71
Other organic matters,	2746·87	572·49	634·86
Peroxide of Iron,	2·14	7·59	1·20
Lime,	30·91	19·42	8·64
Magnesia,	5·41	3·89	2·15
Chloride of Sodium,	17·22	5·53	5·88
Soda,	32·62	7·50	3·74
Potash,	6·14	6·25	9·76
Sulphuric Acid,	7·54	5·07	3·59
Phosphoric Acid,	19·10	8·14	12·82
Silicic Acid	3·00	3·57	0·69
Total,	22,260·48	8756·55	8283·30
Nitrogen,	73·47	74·60	49·71
Total Ash,	124·08	66·96	48·47

The most remarkable changes which present themselves in this stage are the diminution in the quantity of water contained in the stalks, and the increased amount of albuminous compounds in the leaves. The former is obviously due to the production of woody fibre, as indicated by the increase in the percentage of other organic matters, of which, in the stalks at least, that substance forms the preponderating ingredient, and is required to give them the firmness necessary to support the increased weight of the plant. The steady increase in the albuminous compounds in the leaves is no doubt a store of these substances laid up for the supply of the seed, which is now just beginning to form.

In the mineral constituents the most striking change is the great increase in the amount of lime in the stalks, and as that substance is generally very abundant in the wood of large trees, it is possible that it accompanies woody fibre, and assists in strengthening the stems of plants generally in the same manner as silica does those of the grasses and cereals. The ash of the leaves does not materially differ from that of the former stages. Most interesting, however. is that of the pods, which is extremely rich in both potash and phosphoric acid, and in their accumulation there we have evidence of a provision being made for the supply of the seed with those elements which form so large a proportion of the mineral matters of all seeds. From the last table, giving the total amount of matters in the acre, this effect becomes very apparent. In the third stage the entire quantity of potash contained in leaves and stalks, &c., was 20·09 lbs. In the 4th stage it was 22·15 lbs., showing a very small absolute increase. But now the pods contain 9·76 lbs., or nearly half of the whole, and only 12·39 lbs. are left for leaves and stalks together. A similar change has occurred in the distribution of phosphoric acid, there being in the third stage 33·09 lbs. in stalks and leaves together; and in the fourth 40·06 lbs. in all, of which 12·82 lbs. are in the pods, leaving only 27·24 lbs. for the other parts.

As regards nitrogen, also, almost the whole of that absorbed has gone to the pods, the increase in the stalks and leaves being only 6 lbs., while in the pods 49·71 lbs. has been accumulated.

5th Stage, 7th October, 1864.

Owing to the state of the weather at the beginning of October, it was found inadvisable to take a sample of this stage, until the 7th of the month, and the plants then showed a striking change. Their height had increased from 43 to 48 inches on the average, but their weight had diminished, partly owing to the reduced per centage of water, but more especially to the decay of the leaves, some of which had become quite black and shrivelled. The pods, however, as might be expected, had made great progress, their weight being between thirteen and fourteen times as great as it was on the 1st September. The beans had now attained some size, and an attempt was made to separate them from the pods for analysis, but it had to be abandoned, as it was found impossible to obtain a sufficient quantity for the purpose.

The weight of a hundred plants was in grains—

Roots, ...	26,880
Stalks, ...	143,600
Leaves, ...	28,400
Pods, ...	76,160
	275,040

Giving for the weight in lbs. per acre—

Roots, ...	3840·00
Stalks, ...	20,514·30
Leaves, ...	4057·14
Pods, ...	10,880·00
	39,291·44

From the analysis of each of these portions, the following results were obtained:—

	Roots.	Stalks.	Leaves.	Pods.
Water, ...	78·51	84·26	84·48	79·27
Albuminous compounds, . .	2·81	1·31	5·37	5,12
Other organic matters, . .	17·80	13·89	7·63	14·72
Ash, ...	0.88	0·54	2·52	0·89
	100·00	100·00	100·00	100·00
Nitrogen, ...	0.45	0·21	0·86	0·82

Calculated dry—

	Roots.	Stalks.	Leaves.	Pods.
Albuminous compounds, .	13·37	8·68	34·81	24·06
Other organic matters, . .	82·53	87·87	48·94	71·64
Ash, ...	4·10	3·45	16·25	4·30
Nitrogen, ...	2·14	1·39	5·57	3·85

From these results the weight per acre of each of the constituents is calculated in the following table :—

	Roots.	Stalks.	Leaves.	Pods.	Total.
Water, . .	3014·78	17,285·29	3,427·47	8,624·57	32,352·11
Albuminous compounds,	107·90	269·26	217·87	557·05	1,152·07
Other organic matters,	683·53	2,865·63	313·93	1,606·31	5,469·40
Ash, . .	33·79	94·13	97·87	92·07	317·86
Nitrogen, . .	17·28	43.08	34·89	89·21	184·46

The composition of the ash of the stalks, beans and pods, was now as follows :—

	Stalks.	Leaves.	Pods.
Peroxide of Iron .	2·87	8·09	1·77
Lime . . .	18·64	16·88	13·08
Magnesia . .	1·44	3·74	5·83
Chloride of Sodium .	18·34	9·23	9·52
Soda . . .	18·20	0·30	10·22
Potash . . .	5·89	5·27	23·32
Sulphuric Acid . .	5·62	3·81	6·39
Phosphoric Acid. .	8·06	5·75	18·79
Silicic Acid . .	2·63	2·61	0·66
Carbonic Acid . .	15·14	4·28	4·68
Sand . . .	3·21	40·76	1·38
Charcoal. . .	0·42	——	4·93
	100·46	100·72	100·57

And, when calculated after deduction of sand, charcoal, and carbonic acid—

Peroxide of Iron .	3·51	14·53	1·97
Lime . . .	22·92	30·31	14·59
Magnesia . .	1·76	6·71	6·38
Chloride of Sodium .	22·55	16·58	10·72
Soda . . .	22·36	0·54	11·50
Potash . . .	7·21	9·46	26·03
Sulphuric Acid . .	6·62	6·84	7·12
Phosphoric Acid. .	9·86	10·33	20·96
Silicic Acid . .	3·21	4·70	0·73
	100·00	100·00	100·00

The total quantities of the different constituents removed, by the crop, from an acre of land, in lbs., is :—

Water . . .	17285·29	3427·47	8624·57
Albuminous compounds	269·25	217·87	557·05
Other organic matters	2865·63	313·93	1606·31
Peroxide of Iron .	3·18	8·22	1·79
Lime . . .	20·65	17·13	13·25
Magnesia . .	1·60	3·80	5·90
Chloride of Sodium .	20·32	9·37	9·64
Soda . . .	20·17	0·30	10·34
Potash . .	6·53	5·34	23·61
Sulphuric Acid .	6·23	3·86	6·46
Phosphoric Acid .	8·92	5·83	19·02
Silicic Acid . .	2·97	2·64	0·67
Total . .	20514·30	4015·76	10878·61

	Stalks.	Leaves.	Pods.
Nitrogen . .	43·08	34·89	89·21
Total Ash . .	90·57	56·49	90·68

The whole condition of the plants at this stage is indicative of their progress towards maturity. The water and albuminous compounds in the stalks have undergone a further decrease, and the woody fibre has increased. The leaves have also lost water, a portion of them having become dry, withered, and decayed. The mineral matters contained in them are also much larger in amount, but this is due to sand mechanically adhering to them, which it was impossible to remove, in consequence of their decayed state. The pods had also become much drier, and the albuminous compounds and other organic matters contained in them had undergone a proportionate increase.

The most conspicuous change in the ash of the stalks and leaves is the diminution in the per centage of phosphoric acid, which has been withdrawn from them to supply the wants of the pods. The transference of the different mineral matters, however, is most distinctly seen in the table giving the total quantities contained in the acreable produce. It thus appears that there has been a remarkable increase in the proportion of potash, which has risen from 22·15 to 35 48 lbs., of which the greater part is now accummulated in the pods. This increase in the quantity of potash is very puzzling, for it is confined to that element. The phosphoric acid is the same as it was in the fourth stage, the relative quantities being 33·09 and 33·77 lbs, while the amount of lime has decreased. It is possible that, had we examined the plants at some period between the 1st September and 7th October, some explanation of a fact which is now unintelligible might have been discovered.

The total quantity of nitrogen contained in the plants at this stage has diminished, no doubt owing to the decay of the leaves, and the distribution of what remains has materially altered, more than one half of it being now contained in the pods.

6*th Stage*, 8*th November*, 1864.

The continued rains of the month of October, proved most unfavourable to the crop, and so protracted the process of ripening, that it was not till the 8th November that it was ready for the sickle, a period which, it is scarcely necessary to say, was far later than that at which the crop would be harvested in ordinary seasons. The average height of the plants was 1 or 2 inches greater than in October, but little weight is to be attached to a difference such as this. The leaves had now almost entirely decayed away, and only a few blackened and moist fragments hung on the stems. The beans, being ripe, were separated from the pods and weighed apart. The weight in grain of the different parts of a hundred plants was—

Roots,	25,000
Stalks,	70,600
Leaves,	3,200
Pods,	27,850
Beans,	25,050
	126,700

Giving for the weight in lbs. per acre:—

Roots,	3,571·43
Stalks,	10,085·71
Leaves,	457·14
Pods,	3,978·57
Beans,	3,578·57
	21,676·42

Owing to the decayed condition of the leaves, it appeared inadvisable to attempt their proximate analysis, which would only have led to erroneous results, but they were burned, and the composition of the ash determined. The proportion of the different constituents of the other parts were as follows:—

	Roots	Stalks	Pods	Beans
Water, . .	74·43	72·40	84·30	60·30
Albuminous compounds,	2 87	2·43	4·18	11·37
Other organic matters,	21·76	23·96	10·83	26·85
Ash, . . .	0·94	1·21	0·69	1·48
	100·00	100·00	100·00	100·00
Nitrogen, . .	0·46	0·39	0·67	1·82

Calculated dry, these numbers give:—

Albuminous compounds,	11·37	9·00	26·68	28·75
Other organic matters,	84·93	86 60	68 92	67·50
Ash, . . .	3·70	4·40	4·40	3·75
	100·00	100·00	100·00	100·00
Nitrogen, . .	1·82	1·44	4·27	4·60

The weight in lbs. per acre is, therefore:—

	Roots	Stalks	Pods	Beans	Total
Water, . .	2658·22	7302·05	3353·93	2157·88	15,472·08
Albuminous compounds,	102·67	245·83	166·30	407·06	921·86
Other organic matters,	776·97	2438·10	434·68	960·67	4610·42
Ash, . . .	33·57	99·73	23·66	52·96	209·82
Nitrogen, . .	16·42	39·33	26·66	65·13	147·54

The composition of the ash at this stage was:—

	Stalks	Leaves	Pods	Beans.
Sulphur,* . .			1·63	.
Peroxide of Iron, .	2·44	5·09	6·04	0·65
Lime, . .	18·36	16·80	10·98	6·52
Magnesia, . .	3·71	3·18	4·24	7·39
Chloride of Sodium, .	14·85	11·24	11·70	2·64
Soda, . . .	19·44	6·31	15·15	6·49
Potash, . .	4·15	6·80	17·08	23·48
Sulphuric Acid, .	7·88	7·44	3·64	5·30
Phosphoric Acid, .	5·02	7·48	9·97	36·62
Silicic Acid, . .	2.88	3·83	2·40	0·10
Carbonic Acid, .	18·22	8·37	14·34	—
Sand, . . .	2·76	22·23	2·20	3·30
Charcoal, . .	0·45	1·43	0 80	7·26
	100·16	100·20	100·48	99·75

And these when re-calculated, after deduction of carbonic acid, sand, and charcoal, and with the sulphur in the pods converted into sulphuric acid, give:—

Peroxide of Iron, .	3·10	7·32	7·05	0·73
Lime, . .	23·25	24·58	12·81	7·31
Magnesia, . .	4·72	4·66	4·94	8·28
Chloride of Sodium, .	18·89	16·59	13·65	2·96
Soda, . . .	24·72	9·35	18·09	7·28
Potash, . .	5·26	10·98	19·95	26·31
Sulphuric Acid, .	10·01	10·91	8·96	5·94
Phosphoric Acid, .	6·38	11·00	11·74	41·08
Silicic Acid, . .	6·66	5·62	2·81	0·11
	100·00	100·00	100 00	100·00

The proportion of the different constituents of the plant at this stage without leaves was in lbs. per acre:—

	Stalks	Pods	Beans
Water, . .	7,302 05	3353 93	2157 88
Albuminous compounds,	245·83	166·30	407·06
Other organic matters,	2,438·10	434·68	960·67
Peroxide of Iron, .	2·99	1·63	0·37
Lime, . .	22·47	2·98	3·73
Magnesia, . .	4·54	1·14	4·34
Chloride of Sodium,	18·17	3·15	1·51
Soda, . .	23·80	4·21	3·72
Potash, . .	5·08	4·61	13·35
Sulphuric Acid, .	9·64	2·07	3·03
Phosphoric Acid, .	6·14	2·64	20·97
Silicic Acid, .	3·52	0·64	0 05
	10,082 33	3977·98	3376·68
Nitrogen, . .	39 33	26·66	65·13
Total ash, . .	96·35	23·07	51·67

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* Owing to the difficulty of completely burning the ash of the pods, a small quantity of sulphuric acid was reduced to sulphur, which was carefully estimated. In the re-calculated analysis, this has been converted into sulphuric acid.

The extremely unfavourable character of the season of 1864 for the bean plant is best indicated by the late period at which it attained maturity; for, though the climate of Ayrshire is wet, and harvest often late, it is only in quite exceptional seasons that beans remain in the field till the beginning of November, and when this happens, the crop is always small and inferior in quality. It was most unmistakeably so on the present occasion, for the produce was far below the average, and the beans were a most inferior sample. The produce, as contained in the foregoing tables, amounted to 3578·57 lbs. per acre, but it must be borne in mind that this is the weight of the beans at the time the crop was reaped, and when they still contained 60·3 per cent. of moisture. After being stacked for some months the quantity of water would have been greatly reduced, and their weight would have diminished to less than half, or possibly to about 1600 lbs. per acre; and assuming 50 lbs. as the bushel weight—which it certainly would not have exceeded—this would give 32 bushels, or about 4 quarters per acre.

The progress towards maturity is attended by a very great diminution in the quantity of water in all parts of the plant, but more especially in the stalks which now contained a very much larger quantity of woody fibre than at any previous stage. The leaves, too, had almost entirely disappeared, having become black and rotten, and most of them having decayed and fallen off. For this reason the amount of matters removed from the soil appears to have diminished, and in point of fact the decaying leaves had already returned to the soil from which they had been derived. The composition of the ash of the different parts of the plant has perceptibly changed. The leaves have gathered into themselves a larger proportion of potash and phosphoric acid, and there has consequently been a marked diminution in the quantity of those substances in the stalks. It is remarkable, however, that the beans are by no means so rich in potash as they generally are, for in place of 50 per cent., the quantity they usually contain, there is here only 26·31, or little more than half that amount.

Reviewing the whole results of these experiments, we find in them further evidence, in addition to that offered by the previous series of researches on the turnip and wheat, of the extremely limited period of time within which the important cultivated crops gather the great part of the matters which form their mass. In the early part of their growth their progress is extremely slow, but so soon as they have produced the organs by which their food can be drawn from the soil and the air, they start into active growth, and rapidly attain their full weight and development, but after a certain period they make but little further advance in point of size and weight, although great changes take place in the distribution of the substances through their different organs. These points are made more obvious by the following table, which gives in lbs. the total quantities of the different substances contained in the entire bean plants without roots, at the six stages into which their growth was divided :—

	1st Stage	2nd Stage	3rd Stage.	4th Stage	5th Stage	6th Stage.
Water, . . .	807·19	5,650·37	21,714·85	33,870 29	29,227·33	12,813·86
Albuminous compounds,	34·74	254·17	886·77	1,235·99	1,044·17	819·19
Other organic matters,	67·98	475 07	1,841·47	3,954·24	4,358·34	3,833·45
Peroxide of Iron, .	0·49	2·92	24·92	10·93	13·00	4·99
Lime,	3·92	16 06	43·61	58·97	51·03	21·18
Magnesia,	0 50	3·95	12 87	11 45	11·30	10 02
Chloride of Sodium,	1·82	10 95	33 58	28 63	39 33	22 86
Soda .	0 22	9·40	39 72	43 86	30 81	31·73
Potash, .	0 62	7 71	20 09	22·15	35 45	23 04
Sulphuric acid,	0·98	5 08	15 61	16 20	16 55	14 74
Phosphoric acid	0 95	10·66	33 09	40 06	33·77	29·75
Silicic acid,	1 02	4 31	6·26	7·26	6·28	4 21
	919 93	6,450 65	24,672·84	39,300·03	34,977·39	17,629·02
Nitrogen, . . .	5 56	40 70	142 10	197 78	167·18	131·12

From this table it appears that while a single bean plant exclusive of roots weighed after a month's growth only 72·65 grains, which may be described as its increase in weight in the first month of its existence, it gained during the month of July no less than 1260 grains, or more than 17 times as much, while in the months of August each plant gained 1022 grains, or 14 times as much as it did in the first month. It was, therefore, within these two months that the active growth of the plants was confined. After that time the quantity of valuable matters absorbed was trifling, and owing to loss of water, the plants actually diminished in weight. The leaves also began to decay and fall, a change which, however, took place slowly during September and chiefly towards its close, but was so active during October that they had almost disappeared when the plants were ripe.

The practical conclusions to be drawn from these experiments are very obvious. They teach us that, as the great part of the constituents of the bean crop are removed from the soil within the space of two months, it must be of the greatest moment to use manures capable of yielding up their valuable matters within a short period. If they are of a kind which do not become available till late in the season they are practically lost, so far as the crop to which they are applied is concerned, although, of course, they remain for future years.

Important also is it to notice how large is the quantity of mineral matters contained in the crop, in which respect it greatly exceeds wheat or any other cereal. An average crop of wheat contains about 148 lbs. of mineral matters, of which almost exactly half is silica, leaving about 74 lbs. for all the other substances, while the bean crop in its state of greatest development, in its 5th stage contained no less than 237·74 lbs. per acre, of which only 6·28 lbs. were silica. It is clear, therefore, that as far as all mineral matters, except silica, are concerned, the bean draws more largely on the soil than wheat. At a later period of its growth, when its leaves decay, a good deal of this mineral matter returns to the land, but still in the straw and beans the quantity of matters removed is much larger than that carried off by wheat, and we see, therefore, how important it is to save and restore to the soil the straw of this plant.

I refrain at the present moment from drawing any comparison between the bean and the other crops analysed, as it appears better not to take up the minute consideration of the various questions which arise, until a larger number of plants has been examined.

III.—ON THE ADULTERATION OF OIL-CAKE.

There is probably no article of agricultural consumption which is at present so frequently and grossly adulterated as oil cake. The fraud, too, is one of comparatively recent introduction, for even ten or twelve years since it was rare, while now it has attained really gigantic proportions, and is carried on with such skill and ingenuity, that the most experienced purchaser is liable to be deceived, even when he exercises all his prudence and caution, for the mixtures which are offered to him are not only the most perfect imitation of the genuine article, but it not unfrequently happens that an adulterated cake will, to the eye, appear superior even to those which, though genuine, are not of the highest quality.

This adulteration is a subject which must at all times attract the attention of the feeder, but becomes doubly important at the present time, when epidemic disease is rife, and when nutritive food of the best quality is of especial importance, for it is by maintaining stock in the highest state of health that they are most likely to resist its attacks. I propose, therefore, in the present paper, to direct attention to the composition and nature of adulterated cakes; and it is the more necessary to do this, because considerable misapprehension appears to exist as to the mode in which its quality is to be estimated. The farmer most commonly judges by the eye, and if the appearance of the cake be good, and its taste sweet and free from bitterness, he is often, indeed most generally, satisfied. If he is more cautious, he demands the analysis of the cake he is about to buy, and ascertains whether the amount of oil, albuminous compounds, &c., come up to the standard to which he has been accustomed. Both methods of judging are fallacious; the first, no doubt, more so than the second, for the adulterator, dealing with the farmer who judges by the eye and the palate, has only to deceive these organs; while, if he deals with the more cautious individual who looks at the analysis, he has to solve the somewhat more difficult problem of concocting a mixture which shall resemble the genuine article, not only in taste and appearance, but in composition also. In the former case the number of substances which can be used for adulteration is pretty large; in the latter it is more restricted, and, in general, it is necessary to use them more cautiously, and for the most part in smaller quantity.

It is scarcely necessary to observe that the substances used for adulterating oil-cake must be of vegetable origin, and those are selected which can be most easily mixed with linseed, without provoking suspicion, and are at the same time materially lower in price. Bran, rice-dust, rape, and a variety of similar substances are used for the purpose. In fact, the number of materials which can be employed is very large, and the selection is greatly influenced by local circumstances. The existence near the soil crusher's premises of a work furnishing a suitable refuse which can be introduced into the oil-mill without exciting suspicion will often determine its use; and thus it happens that the materials employed are constantly changing, and it is often difficult, if not impossible, to identify them when they are ground up in the cake, though it may be easy to say that they are not linseed.

The adulterations of oil cake are of two kinds—1st, Those which seek to imitate the real cake both in appearance and composition. 2nd, Those in which so large a quantity of inferior material is added, that the composition of the cake is materially altered.

The first is necessarily by far the most dangerous kind of adulteration, and that most likely to escape detection. It admits of being carried out with comparative ease, in consequence of the considerable variation in the composition of genuine linseed cake, which appears to be due to differences in the quality of the seed. In some instances the seed is small and shrivelled, and the husk bears a large proportion to the kernel, in others it is large and plump, and then the proportion of husk is small; and when the latter seed is crushed, it gives a cake much richer in albuminous compounds than the former. It is not easy to say to what this difference in the quality of the seed is due, but I think I have observed a decided superiority in that grown in warm climates. Whatever may be the cause of the difference, there is no doubt about its effect on the composition of the cake, as may be seen from the subjoined analyses of two samples, both of which were ascertained by careful and minute examination to be made from pure linseed, without foreign admixture—

	I.	II.
Water,	10·91	11·54
Oil,	12·40	10·86
Albuminous compounds,	28·53	23·75
Gum, mucilage, &c.,	33·49	38·33
Fibre,	7·56	· 7·21
Ash,	7·11	8·31
	100·00	100·00
Nitrogen,	4.56	3·80

The ash contains—

Phosphates,	1·52	2·01
Phosphoric acid in union with alkalies,	1·03	1·13
Sand,	19.78	2·12

Now bran contains 13·80 per cent. of albuminous compounds and 5·46 of oil, and if the adulterator chose to add it to the first of these cakes in the proportion of one to three, he would get a mixture containing 24·84 per cent. of albuminous compounds and 10·74 of oil, so that the adulterated cake would actually appear somewhat better than the genuine, though inferior cake, provided the mere analytical numbers were examined; and if the bran were finely ground, and the cake well pressed, it would look quite as well as the genuine article. If, now, the adulterator chose to look about for some substance fitted to correct the effect of bran in reducing the per centage of albuminous compounds, he has no difficulty in finding a variety of materials to suit his purpose. He might use decorticated earth nut cake, containing 44·0 per cent. of these substances; poppy cake, with 34·00; rape cake, with 30·00; and, by careful adjustment of the relative quantities of these seeds, he might obtain almost anything he required. Thus a mixture of three parts of the cake No. 2, one of bran and two of earth nut cake, would contain 28·84 of albuminous compounds, so that a mixture containing only half its weight of linseed, and that of inferior quality, would, if the analysis only were looked at, appear rather better than another sample composed entirely of the best linseed.

As an illustration of this kind of adulteration, I give the two following analyses of oil cakes, recently sent to the Laboratory:—

	I.	II.
Water,	12·14	11·14
Oil,	10·04	10·61
Albuminous compounds,	26.06	26·75
Gum, Mucilage, &c.,	37·75	33·16
Fibre,	7·96	8·74
Ash,	6·05	9·60
	100·00	100·00
Nitrogen,	4·17	4·28

The ash contained—

Phosphates, ...	2·46	1·85
Phosphoric Acid, combined with Alkaline,	1·20	0·94
Sand, ...	0·94	2·96

The seller of the first of these cakes assured the buyer that it was "the best in the world," and there is certainly nothing in the *analysis* of either sample calculated to excite suspicion. In fact the buyer, who decided merely by the analytical numbers, would at once accept these as genuine, and yet they were found, on careful examination, to contain both bran and rape. The quantity of bran appeared to be about the same in both samples, but the rape was more abundant in the first than in the second. There is no method of determining exactly the proportion of these substances in a cake, but I should estimate it at about 20 to 25 per cent. of the two substances together in No. 1, and somewhat less than this in No. 2, but the general resemblance of the two samples is so great that I am inclined to suspect they may be from the same maker, although they were sent to me from two entirely different parts of the country. If now we look to the value of these cakes it becomes necessary to consider that of the substances of which they are made up. A genuine oil cake may be assumed to cost about £11 per ton, and bran and rape cake about £6.* And assuming a cake contain 25 per cent. of these substances, its extreme value should be £9 15s. per ton. But it could not be sold to the farmer at that price. And the reason for this is that the manufacturer cannot mix together linseed, rape, and bran, and press the mixture, because, if he did so, he would get a mixture of linseed and rape oils, which would either be altogether unsaleable, or would bring a price materially less than could be obtained if each was sold in the pure state. He must therefore press the two seeds separately, grind them down and mix them with the bran, and press them a second time into cakes; and as this operation cannot cost less than 15s. per ton, it is obvious that he must sell the cake at £10 10s. if he is to obtain a profit. The farmer must therefore be charged 15s. per ton for allowing himself to be deceived; and this is the most favourable view of the case, for the chance is that £11 will be asked for the article, and very possibly 5s. or 10s. more, on the plea that it is "the best cake in the world."

The necessity of re-pressing the cake when an oily seed is to be used for adulteration limits to some extent the use of these substances, and confines it chiefly to those cases in which a large quantity of spurious matter is added to the cake. The most common practice is to add to the linseed a substance containing little or no oil, so as to enable the crusher to sell his cake at a price slightly below that at which the genuine article is offered. and for this purpose bran is the material most commonly employed, but oat dust, rice dust, the husk of buckwheat, and similar refuse vegetable matters are used, and many substances which were formerly thrown away have now a definite commercial value, and are regularly offered to the oil crushers. Rice dust, for example, which is produced in considerable quantity in the manufacture of rice flour, is all absorbed by the crushers at a price of £3, and so it is with many other substances. When these adulterating materials are used in small quantity, to the extent, for instance, of 10 or 15 per cent, the most practised eye cannot distinguish any difference in the appearance of the cake. Indeed, it not unfrequently happens that it looks better than the genuine article, but when the amount is large, it can scarcely fail to attract attention. The cake has then a paler colour, is much softer, and splits into scales with greater or less ease. These characters are most distinctly seen when coarse bran has been used. If it has been finely ground they are less apparent, and with rice dust the tendency to split is scarcely apparent, but this, no doubt, is partly due to the fact that that substance cannot be used in very large quantity, as it renders the cake too pale in colour.

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* At the present moment the price of rape cake has risen to £7 per ton, in consequence of the short crop of the past season. The usual price is about £5 10s., both for it and inferior bran, but I have chosen £6 as a fair value.

As examples of cake adulterated with very large quantities of substances which do not themselves yield oil, I give the following analyses:—

	III.	IV.
Water, ...	11·85	12·61
Oil,	9·40	10·59
Albuminous compounds,	14·68	17·31
Mucilage, gum, &c.,	48·86	45·34
Fibre, . .	9·15	8·25
Ash, . .	6·06	5·90
	100·00	100·00
Nitrogen, ...	2·35	2·78

The ash contains:—

Phosphates, ...	3·05	1·21
Phosphoric acid combined with alkalis,	1·25	1·26
Sand, ...	1·00	2·55

The first of these cakes, though rather pale in colour, was in other respects satisfactory to the eye, and might have perfectly well passed for a genuine sample. Analysis, however, at once disclosed the fact that it could not be genuine, and a further examination proved that it contained abundance of bran, and I estimate the proportion at not less than 40 or 50 per cent. In fact a mixture of equal weights of good linseed and bran would contain about 20 per cent. of albuminous compounds, while the sample contained only 14·68, and from this fact I am inclined to suspect that the two materials used in making the mixture were themselves of very low quality. The price at which this cake was offered was £10 10s., while its value certainly could not have exceeded £8, allowing the bran to be worth £6 per ton.

The other sample was of a very different kind. The eye at once detected adulteration, and the suspicion which was then excited was abundantly confirmed by analysis. The substance used in this case was one of the great family of grasses, but the species I have been unable to identify. It most nearly resembles the oat, and is probably the seed of some of the cultivated grasses; but I need scarcely say that it is not possible to ascertain with certainty to which of the almost endless number of species it belongs. The adulteration in this case was extremely rude, so much so that the gentleman by whom it was sent for analysis at once suspected it, but as a proof of the careless manner in which such articles are too often bought, he tells me that, at least, 50 tons had been sold in his immediate neighbourhood.*

Another adulterating material has been used in a cake manufactured at Tilsit, of which the following is an analysis:—

	V.
Water, ...	11·50
Oil, ...	10·05
Albuminous compounds, . . .	22·81
Mucilage, gum, &c., . . .	40·48
Fibre, ...	7·11
Ash, ...	8·05
	100·00
Nitrogen, ...	3·65

The ash contained:—

Phosphates, ...	2·93
Phosphoric acid combined with alkalis, .	0·44
Sand, ...	3·14

In this case the cake looked well, but it contained some bran, and a large quantity of some seed which has a close resemblance to rice, and which it was at first supposed might be the refuse of that substance, but I am now inclined to think it is some grass seed, though what species it is I cannot pretend to say. The price of this cake was £8 15s., which no doubt is far above its value, as the adulterating article was probably a refuse of little or no value.

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* Since this was written, I have ascertained that this cake was produced from an "inferior" linseed, a sample of which I found to contain 42 per cent. of grass seed, the greater part of which was identical with that I had detected in the cake. I have been unable, as yet, to ascertain the species of grass, but hope to do so.

Bad as these cases are, they are surpassed by that of the following sample, which contained:—

	VI.
Water, ...	12·40
Oil,	15·35
Albuminous compounds,	23·36
Mucilage, gum, &c.,	27·09
Fibre, . .	13·64
Sand, . .	8·16
	100·00
Nitrogen, ...	3·74

The ash contained:—

Phosphates, ...	2·76
Phosphoric acid combined with alkalis, .	1·18
Sand, ...	2·74

If here the analytical numbers only be looked at, the sample might be described as an oil cake of rather low quality, but there is nothing to excite suspicion as to the sophistication it had undergone. The fact is that this is really the grossest case which ever came under my notice. To call it adulterated is to understate the case. Substitution would be a more correct expression, for it contained only a small proportion of linseed, the bulk of it being made up of a variety of substances. Among these were detected bran, the root of some plant, woody fibre, some kind of nut, and portions of a succulent plant, besides others which could not be identified.

It is unnecessary to multiply analyses of such oil cakes, though it would be easy to do so to almost any extent. A sufficient number has been given to show what I am anxious to impress on'the farmer, which is, that the mere analytical numbers, without comment, are not sufficient for his purpose, because mixtures of inferior substances may be made which simulate, in the most perfect manner, the composition of genuine oil cake. It may be said indeed that, provided the farmer gets an equal amount of valuable nutriment, it does not matter to him whether it is in the form of linseed, or of any other substance which may have been substituted for it. In practice, however, he proceeds on an entirely different plan. He does not pay the same price for rape cake as for linseed cake, though the nutritic value of the former, as indicated by analysis, is as high, sometimes higher, than that of the latter. He is ready at all times to pay nearly twice as much for oil cake, because he has found by experience that its nutritive matter is more available (that is, produces a greater weight of meat) than the same quantity of rape cake; and it is quite obvious that the same must apply to it when mixed with any other substance. Granting even that a mixture of linseed with a small quantity of rape does as well as linseed alone, that is no reason why he should pay for the mixture the price of linseed (which he is pretty sure to do) when he can buy them separately for less. Whenever a mixture is made, the farmer may rest assured that this cannot be done without entailing some cost which he is called upon to pay in addition to the market value of the materials mixed. That extra cost may be greater or less according to circumstances, but it must always exist.

In order that the farmer may have some guide to direct him in the purchase of cakes, I shall conclude with a few rules which he will do well to observe; and I find this the more necessary, because the character and composition of good oil cakes are sometimes but imperfectly understood, and I infer this because I have recently been shown the analysis of a cake containing 20 per cent. of albuminous compounds, of which I am informed a large quantity was sold last season, though this fact is in itself in the highest degree suspicious—so much so, that I do not hesitate to say the cake must have been adulterated, though I have never seen samples of it.

1. In buying a cake, examine it carefully. It should be hard and difficult to break, and its colour should not be too pale. If it is soft and splits easily, it is almost certain to be adulterated, and if its colour is pale, even though it may be hard, it is suspicions.

2. Examine the analysis. A genuine oil cake of the *best quality* should contain 11 to 13 per cent. of oil, and from 26 to 28 per cent. of albuminous compounds. If made from inferior linseed, the proportion of the latter ingredient may be as low as 24 per cent., but if it falls below 23 it is suspicious, and if much below this quantity, the chances are that it is adulterated.

3. Remember that even if it contain the full amount of those substances, the cake may be made up of inferior matters mixed with some substances rich in albuminous compounds, and take care to observe whether the analysis, in addition to the mere numerical results, states whether the cake is made entirely from linseed.

4. A low-priced cake is probably, though not necessarily, adulterated. As a rule, the market price of a good oil cake is well known, and there is no great room for variations in price; so that if a cake is offered at a rate much below the average, it is scarcely necessary to say that it must be considered doubtful.

5. Obtain from the seller a guarantee that the article is made entirely from linseed without mixture, and ascertain that it is up to the mark. For this purpose a full analysis is not required, a careful examination being enough to detect adulteration, though it will not decide as to the relative *qualities* of different samples which are genuine.

If these rules be adopted, the purchaser will be able to secure a genuine article; but if they are disregarded, he is pretty sure to be taken in. My experience leads me to say that, at the present time, a very large proportion of the oil cakes offered for sale in this country are adulterated, and that this applies more particularly, though not exclusively, to home-made cakes. The manufacturer alleges that he is compelled to have recourse to the practice in consequence of the demand for cheap cake on the part of the farmer, and that unless he used some cheaper substance he could not compete with those who do. So far he is right; for if the farmer will take adulterated cake without question, merely because it is cheap, the fair trader must obviously go to the wall. He must either do as his neighbours do, or find some way out of the difficulty by throwing the burden of protecting himself upon the buyer. This is done by selling several qualities of cake, one only of which is guaranteed as made entirely from linseed; the others are sold without guarantee, and the farmer is left to take them at his own risk. If he does so, he disregards the obvious meaning of their being unguaranteed, and takes what, though apparently cheaper, must unquestionably be a dearer bargain than the more expensive article.

PREMIUMS AWARDED BY THE SOCIETY IN 1865.

I.—REPORTS, &c.

1. L.30 to James Archibald Campbell of Inverawe, Newlands Farm, Rugby, for a Report on the Results of the Application of Town Sewage to the Farm.
2. L.30 to John Dickson, W.S., Greenbank, Perth, for a Report on the Agriculture of Ayrshire.
3. L.20 to Robert J. Thomson, Grange, Kilmarnock, for a Report on different descriptions of Cattle Food.
4. L.15 to Robert J. Thomson, Grange, Kilmarnock, for a Report of Experiments with different varieties of Oats.
5. L.15 to Robert J. Thomson, Grange, Kilmarnock, for a Report of Experiments with different varieties of Wheat.
6. L.15 to John Richardson, Drylawhill, Prestonkirk, for a Report on the same subject.
7. L.15 to Phipps Turnbull, Little Pinkerton, Dunbar, for a Report on the same subject.
8. The Gold Medal to Sir Robert C. Sinclair of Stevenson, Bart., for Improvements on the Estates of Murkle and Dounreay, in the County of Caithness.
9. The Gold Medal to James Dyce Nicol of Ballogie, M.P., for Agricultural Cottages erected in Kincardineshire.
10. The Gold Medal to George Armatage, Lecturer on Veterinary Materia Medica, Albert Veterinary College, Queen's Road, Bayswater, London, for a Report on the Diseases of Farm Horses.
11. The Medium Gold Medal to Robert Hutchison of Carlowrie, Kirkliston, for a Report on Transplanting Trees.
12. L.10 to Peter M'Lellan, Mill-Wright, Abernethy, Perthshire, for improved Thrashing Machine.
13. The Silver Medal to A. Brockie, Fala Mill, Blackshiels, for improved Guano Distributor.
14. The Silver Medal to William Kirkwood, Duddington, Edinburgh, for improved Potato Lifter.
15. The Silver Medal to George Menzies, Bullions, Dunfermline, for improved Sheaf Elevator.
16. The Silver Medal to John Morrison, Superintendent, W. Drummond & Sons, Coney Park Nursery, Stirling, for a Report on Hedgerow Trees.
17. The Silver Medal to William Reid, Granton, Edinburgh, for Water Troughs attached to Railway Trucks.

II.—INVERNESS SHOW, 1865.

CLASS I.—CATTLE.

SHORT-HORN.

Judges—THOMAS HUNT, Thornington, Coldstream; NICOL MILNE of Faldonside, Melrose; and ANDREW MITCHELL, Alloa.

Attending Members—Sir GEORGE MACPHERSON GRANT, Bart.; and GEORGE WILLIAMSON, Shempston.

Section

1. Best Bull calved before 1st January 1863—L.20 to James Geddes, Orbliston, Fochabers. Second. L.10 to Andrew Longmore, Rettie, Banff. Third. The bronze medal to Silvester Campbell, Kinellar, Blackburn, Aberdeen. Fourth—Commended. D. R. Williamson of Lawers, Crieff. The silver medal to A. Cruickshank, Sittyton, Aberdeen, *Breeder* of best Bull.
2. Best Bull calved after 1st January 1863—L.20 to the Duke of Buccleuch and Queensberry, Dalkeith. Second. L.10 to A. J. Balfour of Whittinghame, Prestonkirk. Third. The Bronze Medal to Viscount Strathallan, Strathallan Castle, Auchterarder. Fourth—Commended. Robert Binnie, Seton Mains, Longniddry.
3. Best Bull calved after 1st January 1864—L.10 to Lord Kinnaird, Rossie Priory, Inchture. Second. L.5 to Henry Gray, the Mains, Cushnie, Alford, Aberdeen. Third. The bronze medal to Viscount Strathallan, Strathallan Castle, Auchterarder. Fourth—Commended. Viscount Strathallan.
4. Best Cow of any age—L.15 to Viscount Strathallan. Second. L.8 to Silvester Campbell, Kinellar, Blackburn, Aberdeen. Third. bronze medal to David Ainslie of Costerton, Backshiels. Fourth—Commended. John Mackessack, Balnaferry, Forres.
5. Best Heifer calved after 1st January, 1863—L.10 to Andrew Longmore, Rettie, Banff. Second. L.5 to William Stephen, Inchbroom, Elgin. Third. The bronze medal to William Stephen, Inchbroom, Elgin. Fourth — Commended. John Mackessack, Balnaferry, Forres.
6. Best Heifer calved after 1st January 1864—L.8 to Lord Kinnaird, Rossie Priory, Inchture. Second. L.4 to the Duke of Richmond, Gordon Castle, Fochabers. Third. The bronze medal to James Geddes, Orbliston, Fochabers. Fourth—Commended. Silvester Campbell, Kinellar, Blackburn, Aberdeen.

HIGHLAND.

Judges—R. D. CAMPBELL of Jura; DONALD MACLEOD, Coulmore, Inverness; and JOHN MACLAREN, Monzie, Blair-Athole.

Attending Members—ENEAS W. MACKINTOSH of Raigmore; and JOHN MENZIES PENDER, Auchindoul.

The Medium Gold Medal to James Gordon of Manar, Keith Hall, for Bull, winner of First Prize at Stirling 1864.

The Medium Gold Medal to the Duke of Athole for Cow, winner of First Prize at Stirling 1863.

7. Best Bull calved before 1st January 1862—L.20 to the Duke of Athole, Blair Castle, Blair-Athole. Second. L.10 to Duncan Macpherson, Kingussie. Third. The bronze medal to Robert Peter, Urlar, Aberfeldy.
8. Best Bull calved after 1st January 1862—L.20 to Allan Pollok, Ronachan, Clachan, Cantire. Second. L.10 to Alexander Cameron Campbell of Monzie, Fort-William. Third. The bronze medal to John Stewart, Duntulm, Portree. Fourth—Commended. The Duke of Sutherland, Dunrobin, Golspie.
9. Best Bull calved after 1st January 1863—L.10 to the Duke of Athole, Blair Castle, Blair-Athole. Second. L.5 to Alex. Fraser, Faillie, Inverness. Third. The bronze medal to the Duke of Athole, Blair Castle, Blair-Athole. Fourth—Commended. Allan Pollok, Ronachan, Clachan, Cantire.

10. Best Cow of any age—L.15 to the Duke of Athole, Blair Castle, Blair-Athole. Second. L.8 to the Duke of Athole, Blair Castle, Blair-Athole. Third. The bronze medal to John Malcolm of Poltalloch, Callton Mor, Lochgilphead. Fourth—Commended. Robert Anderson of Lochdhu, Nairn.
11. Best Heifer calved after 1st January 1862—L.10 to Allan Pollok, Ronachan, Clachan, Cantire. Second. L.5 to John Stewart, Duntulm, Portree. Third. The bronze medal to John Malcolm of Poltalloch, Lochgilphead. Fourth—Commended. Allan Pollok, Ronachan, Clachan, Cantire.
12. Best Heifer calved after 1st January 1863—L.8 to John Malcolm of Poltalloch, Callton Mor, Lochgilphead. Second. L.4 to Robert Peter, Urlar, Aberfeldy. Third. The bronze medal to Robert Peter, Urlar, Aberfeldy. Fourth—Commended. John Malcolm of Poltalloch, Lochgilphead.

POLLED (ANGUS, ABERDEEN, AND GALLOWAY).

Judges—ROBERT HECTOR, Montrose; GEORGE MILNE, Haddo, Methlic; A. C. PAGAN, Invergeldie, Comrie.

Attending Members—The Hon. The MASTER OF LOVAT, and JAMES GEDDES, Orbliston.

The Medium Gold Medal to Sir George Macpherson-Grant of Ballindalloch, Bart., Ballindalloch, for Cow, "Mayflower of Montbletton," winner of First Prize at Perth 1861.

The Medium Gold Medal to Wm. M'Combie, Tillyfour, Aberdeen, for Cow, "Charlotte," winner of First Prize at Inverness 1856.

The Medium Gold Medal to Wm. M'Combie, Tillyfour, Aberdeen, for Cow, "Pride of Aberdeen," winner of First Prize at Dumfries 1860, and Battersea 1862.

The Medium Gold Medal to Wm. M'Combie, Tillyfour, Aberdeen, for Cow, "Daisy," winner of First Prize at Stirling 1864.

13. Best Bull calved before 1st January 1863—L.20 to Wm. M'Combie, Tillyfour, Aberdeen. Second. L.10 to Robert Walker, Hillside House, Portlethen, Aberdeen. Third. The bronze medal to Alexander Morison of Bognie, Turriff. Fourth—Commended. John Congreve of Flichity, Inverness. The silver medal, to Wm. M'Combie, Tillyfour, Aberdeen, *Breeder* of best Bull.
14. Best Bull calved after 1st January 1863—L.20 to William M'Combie, Tillyfour, Aberdeen. Second. L.10 to John Collie, Ardgay, Forres. Third. The bronze medal to Thomas Lyell, Shielhill, Kirriemuir. Fourth—Commended. Robert Walker, Montbletton,
15. Best Bull calved after 1st January 1864—L.10 to John Collie, Ardgay, Forres. Second. L.5 to D. R. Lyall Grant of Kingsford, Alford, Aberdeen. Third. The bronze medal to William James Tayler, Rothiemay House, Huntly. Fourth—Commended. William Goodlet, Bolshan, Arbroath.
16. Best Cow (Angus and Aberdeen Breed) of any age—L.15 to William M'Combie, Tillyfour, Aberdeen. Second. L.8 to William M'Combie, Tillyfour, Aberdeen. Third. The bronze medal to Robert Walker, Hillside House, Portlethen, Aberdeen. Fourth—Commended. Robert Walker, Montbletton, Banff.

Best Cow (Galloway Breed) of any age—L.15 to John Cunningham, Whitecairn, Dalbeattie. Second. L.8 to James Graham, Meikle Culloch, Dalbeattie. Third. The bronze medal to James Graham, Meikle Culloch, Dalbeattie. Fourth—Commended. Robert Anderson of Lochdhu, Nairn.

17. Best Heifer (Angus and Aberdeen Breed) calved after 1st January 1863—L.10 to William M'Combie, Tillyfour, Aberdeen. Second. L.5, to William M'Combie of Easter Skene, Aberdeen. Third. The bronze medal to Lord Kinnaird, K.T., Rossie Priory, Inchture. Fourth—Commended. Wm. Goodlet, Bolshan, Arbroath.

Best Heifer (Galloway Breed) calved after 1st January 1863—L.10 to James Cunningham, Tarbreoch, Dalbeattie. Second. L.5 to James Cunningham, Tarbreoch. Third. The bronze medal to the Duke of Buccleuch, K.G., Thornhill. Fourth—Commended. The Duke of Buccleuch.

18. Best Heifer (Aberdeen and Angus Breed) calved after 1st January 1864—L.8 to William M'Combie, Tillyfour, Aberdeen. Second. L.4 to Robert Walker, Montbletton, Banff. Third. The bronze medal to John Collie, Ardgay, Forres. Fourth—Commended. William James Tayler, Rothiemay House, Huntly.

Best Heifer (Galloway Breed) calved after 1st January 1864—L.8 to the Duke of Buccleuch and Queensberry, K.G., Thornhill. Second. L.4 to the Duke of Buccleuch and Queensberry, K.G., Thornhill. Third. The bronze medal to James Cunningham, Tarbreoch, Dalbeattie. Fourth—Commended. James Graham, Meikle Culloch, Dalbeattie.

AYRSHIRE.

Judges—John Baird of Ury, Stonehaven; Peter Drew, Carmyle, Tollcross, Glasgow; Duncan Macfarlane, Torr, Helensburgh.

Attending Members—R. B. Æ. Macleod of Cadboll, and William Murray, Kilcoy.

The Medium Gold Medal to the Duchess Dowager of Athole, Dunkeld, for Cow, "Premium," winner of First Prize at Glasgow 1857.

The Medium Gold Medal to the Duchess Dowager of Athole, Dunkeld, for Cow, "Collyhill," winner of First Prize at Edinburgh 1859.

The Medium Gold Medal to Andrew Ralston, for the Glamis Trustees, Glamis House, Glamis, for Cow, winner of First Prize at Perth 1861.

19. Best Bull calved after 1st January 1862—L.20 to John Stewart, Burnside Cottage, Strathaven. Second. L.10 to Robert Wilson, Nether Johnston, Kilbarchan. Third. The bronze medal. *No award.* The silver medal to James Meikle, Blackburn Hall, Whitburn, *Breeder* of best bull.

20. Best Cow in milk, of any age—L.10 to the Duchess Dowager of Athole, Dunkeld. Second. L.5 to the Duchess Dowager of Athole. Third. The bronze medal to the Duchess Dowager of Athole. Fourth—Commended. Robert Wilson, Nether Johnston, Kilbarchan.

21. Best Cow in calf, of any age—L.10 to the Duchess Dowager of Athole. Second. L.5 to the Duchess Dowager of Athole. Third. The bronze medal to the Duchess Dowager of Athole. Fourth—Commended. the Duchess Dowager of Athole.

22. Best Heifer calved after 1st January 1863—L.10 to John Stewart, Burnside Cottage, Strathaven. Second. L.5 to William Dunn of Dalmore, Tarbolton. Third. The bronze medal to Wm. Dunn of Dalmore, Tarbolton. Fourth—Commended. John Stewart, Burnside Cottage, Strathaven.

FAT STOCK.

Judges—John Dudgeon, Almondhill, Kirkliston; Thomas Middleton, Davidston, Cromarty; J. Stewart Menzies of Chesthill, Aberfeldy.

Attending Members—WALTER ELLIOT of Wolfelee, and DAVID MONRO of Allan.

23. Best Ox, of any Pure or Cross breed, calved after 1st January 1862—L.8 to Richard Heath Harris, Earnhill, Forres. Second. L.4 to Walter Scott, Glendronach, Huntly. Third. The bronze medal to James Geddes, Orbliston, Fochabers. Fourth—Commended. The Earl of Seafield, Cullen House, Cullen.
24. Best Ox, of any Pure or Cross breed, calved after 1st January 1863—L.6 to Sir A. P. Gordon-Cumming of Altyre, Bart., Forres. Second. L.3 to Sir A. P. Gordon-Cumming, Bart. Third. The bronze medal to J. & W. Martin, Aberdeen. Fourth—Commended. Archibald Garden, Netherton, Forres.
25. Best Ox, of any Pure or Cross breed, calved after 1st January 1864—L.4 to Sir. A. P. Gordon-Cumming of Altyre, Bart. Second. L.2 to David Ainslie of Costerton, Blackshiels. Third. The bronze medal to John Ferguson, East Grange, Forres. Fourth—Commended. Sir A. P. Gordon-Cumming, of Altyre, Bart., Forres.
26. Best Highland Ox, calved after 1st January 1861—L.8 to James Gordon of Manar, Keith-hall. Second. L.4 to Andrew Longmore, Rettie, Banff. Third. The bronze medal to Archibald Stewart, Claigan, Dunvegan.
27. Best Highland Ox, calved after 1st January 1862—L.6 to the Duke of Sutherland, K.G., Dunrobin, Golspie. Second. L.3 to Sir Alex. P. Gordon-Cumming, Bart. Third. The bronze medal to Sir A. P. Gordon-Cumming, Bart.
28. Best Cross Heifer, calved after 1st January 1863—L.6 to Henry A. Rannie, Mill of Boyndie, Banff. Second. L.3 to Edward Tew, Coul Cottage, Alness. Third. The bronze medal to Sir Alex. P. Gordon-Cumming of Altyre, Bart. Fourth—Commended. John Hunter, Dipple, Fochabers.
29. Best Cross Heifer, calved after 1st January 1864—L.4 to W. S. Mackintosh, Garlie Hill, Auldearn, Nairn.

EXTRA CATTLE.

Silver Medals were awarded to William Stephen, Inchbroom, Elgin, for Short-horn Heifer; The Duke of Sutherland, for Highland Ox; Richard Heath Harris, Earnhill, Forres, for Polled Ox.

CLASS II.—HORSES

FOR AGRICULTURAL PURPOSES.

Judges—JAMES SALMON, Benston, Paisley; JAMES STEEDMAN, Boghall, Roslin; and ALEXANDER YOUNG, Keir Mains, Dunblane.

Attending Members—JAMES MERRY, of Belladrum, M.P., and ROBERT FRASER, Brackla.

The Medium Gold Medal to Murdo Bethune, Droim of Highfield, Beauly, for Mare, winner of First Prize at Perth, 1861.

The Medium Gold Medal to Sir Alexander P. Gordon-Cumming of Altyre, Bart., Forres, for Mare, winner of First Prize at Inverness, 1856.

Section.

1. Best Stallion, foaled before 1st January 1862—L.30 to Samuel Clark, Manswrae, Kilbarchan. Second. L.15 to James Muir, Hardington Mains, Wiston, Biggar. Third. The bronze medal to the Dowager Duchess of Athole, Dunkeld. Fourth—Commended. William Wilson, Balquharn, Alford, Aberdeenshire. The silver medal to Robert Young, Greenlees, Cambuslang, *Breeder* of best Stallion.

2. Best Entire Colt, foaled after the 1st January 1862—L.20 to David Riddell, Kilbowie, Duntocher. Second. L.10 to Andrew Wilson, Whiteside, Alford. Third. The bronze medal to William Murray, Kilcoy, Killearnan, Ross-shire.
3. Best Entire Colt, foaled after 1st January 1863—L.15 to Samuel Clark, Manswrae, Kilbarchan. Second. L.8 to David Riddell, Kilbowie, Duntocher. Third. The bronze medal to James Kay, Hill Farm, Gargunnock.
4. Best Entire Colt, foaled after 1st January 1864—L.10 to Robert M'Kean, Lumloch, Bishopbriggs. Second. L.5 to the Duke of Hamilton and Brandon. Third. The bronze medal. *No award.*
5. Best Mare (with foal at foot) foaled before 1st January 1862—L.20 to J. N. Fleming, Kilkerran House, Maybole. Second. L.10 to John Hendrie, Castleleathers, Inverness. Third. The bronze medal to the Dowager Duchess of Athole, Dunkeld. Fourth—Commended. Alexander Milne, Corse of Kinnoir, Huntly.
6. Best Mare (in foal) foaled before 1st January 1862—L.15 to J. N. Fleming, Kilkerran House, Maybole. Second. L.8 to Alexander Buchanan, Garscadden Mains, New Kilpatrick. Third. The bronze medal to Robert Moubray of Cambus, Stirling. Fourth—Commended. Adam Gray, Hareston, Insch, Aberdeen.
7. Best Filly, foaled after 1st January 1862—L.10 to the Duke of Hamilton and Brandon. Second. L.5 to Alexander Murdoch, Hilton, Bishopbriggs. Third. The bronze medal to Alexander Stewart, Bog of Cawdor, Nairn. Fourth—Commended. John Adam, Dykeside, Birnie, Elgin.
8. Best Filly, foaled after 1st January 1863—L.8 to David Riddell, Kilbowie, Duntocher. Second. L.4 to Alexander Buchanan, Garscadden Mains, New Kilpatrick. Third. The bronze medal to J. N. Fleming, Kilkerran House, Maybole. Fourth—Commended. John Hunter, Dipple, Fochabers.
9. Best Filly, foaled after 1st January 1864—L.6 to Archibald Johnston, Lochburn, Maryhill, Glasgow. Second. L.3 to J. N. Fleming, Kilkerran House, Maybole. Third. The bronze medal to William Macdonald, Wester Moy, Forres.

PONIES.

Judges—Sir ALEXANDER P. GORDON-CUMMING of Altyre, Bart., and Major HORNE of Stirkoke, Wick.

Attending Members—Lord SALTOUN, and ROBERT GENTLE, Dell, Inverness.

10. Best Pony Stallion, not exceeding 14 hands—L.10 to the Duke of Athole, Blair Castle. Second. L.5 to Charles Hope Johnston, the Hewk, Lockerby. Third. The bronze medal to Donald Macleod, Coulmore, Inverness. Fourth—Commended. Æneas Mackintosh of Daviot, Inverness.
11. Best Pony Mare, not exceeding 14 hands—L.8 to John B. Baillie of Leys, Inverness. Second. L.4 to Fountaine Walker of Foyers, Muirtown, Inverness. Third. The bronze medal to Hugh Mackenzie of Dundonnell, Ullapool. Fourth—Commended. D. C. Marjoribanks of Guisachan, M.P., Beauly.

EXTRA HORSES.

Silver medals were awarded to Lord Lovat, K.T., Beaufort Castle, Beauly, for Pony Mare; Sir A. P. Gordon-Cumming, Bart., of Altyre, Forres, for Gelding; Sir A. P. Gordon-Cumming, Bart., for Gelding; John Gordon of Cluny, Aberdeen, for Thorough-bred Entire Colt; Robert Grant of Kincorth, Forres, for Mare; Alexander Simpson, Seafield, Inverness, for Filly; J. B. Baillie of Leys, Inverness, for Gelding; Duncan Davidson, of Tulloch, Dingwall, for Pony Mare; Duncan Davidson of Tulloch, for Pony Gelding; Lord Lovat, Beaufort Castle, Beauly, for Pony Gelding; D. C. Marjoribanks of Guisachan, M.P., for Pony Gelding; D. C. Marjoribanks, M.P., for Pony Gelding; D. C. Marjoribanks, M.P., for Pony Gelding; John Walker, Maryfield House, Lerwick, for two Shetland Stallions and six Shetland Mares.

CLASS III.—SHEEP.

LEICESTER.

Judges—JOSEPH BELL, Scalehill, Lazonby, Penrith; PETER REID, Drumfork House, Helensburgh; JOHN WILSON, Edington Mains, Chirnside.

Attending Members—Sir KENNETH S. MACKENZIE, Bart., and GEORGE HOPE, Fenton Barns.

Section.

1. Best Tup not above 4 shear—L.10 to David Ainslie of Costerton, Blackshiels. Second. L.5 to A. J. Balfour of Whittingham, Prestonkirk. Third. The bronze medal to Henry A. Rannie, Mill of Boyndie, Banff.
2. Best Dinmont or Shearling Tup—L.10 to William Purves, Linton Burnfoot, Kelso. Second. L.5 to George Torrance, Sisterpath, Dunse. Third. The bronze medal to George Simpson, Courthill, Kelso. Fourth—Commended. George Torrance, Sisterpath, Dunse.
3. Best Five Ewes, not above 4 shear—L.8 to David Ainslie of Costerton, Blackshiels. Second. L.4 to John Garland, Cairnton, Fordoun. Third. The bronze medal to Thomas Ferguson, Kinnochtry, Coupar-Angus. Fourth—Commended. The Duke of Buccleuch, K.G., Dalkeith.
4. Best Five Shearling Ewes or Gimmers—L.8 to George Simson, Courthill, Kelso. Second. L.4 to William Purves, Linton Burnfoot, Kelso. Third. The bronze medal to David Ainslie of Costerton, Blackshiels. Fourth—Commended. The Duke of Buccleuch and Queensberry, K.G., Dalkeith.

CHEVIOT SHEEP.

Judges—WILLIAM AITCHISON, Linhope, Hawick; WILLIAM PURVES, Linton Burnfoot, Kelso.

Attending Members—The Hon. Major GRANT of Grant; and JOHN M'KESSACK, Balnaferry.

5. Best Tup, not above 4 shear—L.10 to James Brydon, Moodlaw, Langholm. Second. L.5 to James Brydon, jun., Kinnelhead, Moffat. Third. The bronze medal to James Brydon, Moodlaw, Langholm. Fourth—Commended. James Brydon, jun., Kinnelhead.
6. Best Dinmont or Shearling Tup—L.10 to James Brydon, jun., Kinnelhead, Moffat. Second. L.5 to James Brydon, jun., Kinnelhead, Moffat. Third. The bronze medal to James Brydon, jun., Kinnelhead, Moffat. Fourth—Commended. Robert Paterson, Bighouse, Thurso.

7. Best Five Ewes, not above 4 shear, with Lambs at foot—L.8 to James Brydon, Moodlaw, Langholm. Second. L.4 to Sir G. Graham Montgomery of Stanhope, Bart., M.P., Stobo Castle, Peebles. Third. The bronze medal to Robert Shortreed, Attonburn, Kelso. Fourth—Commended. William Mitchell, Ribigill, Lairg.
   Best Pen of Lambs—The silver medal to James Brydon, Moodlaw, Langholm. Second—Commended. Sir G. Graham Montgomery of Stanhope, Bart. M.P.
8. Best Five Shearling Ewes or Gimmers—L.8 to Sir G. Graham Montgomery of Stanhope, Bart. Second. L.4 to James Brydon, Moodlaw, Langholm. Third. The bronze medal to John Archibald, Glengilt, Lauder. Fourth—Commended. Robert Paterson, Bighouse, Thurso.

BLACKFACED.

Judges—ALEXANDER DENHOLM, Baitlaws, Biggar; JOHN MACLAREN, Monzie, Blair Athole; DAVID MUNDELL, Auchindream, Lochbroom.

Attending Member—KEITH W. STEWART MACKENZIE of Seaforth.

9. Best Tup, not above four shear—L.10 to Thomas Murray, Eastside, Penicuik. Second. L.5 to John Archibald, Overshiels, Stow. Third. The bronze medal to A. C. Pagan, Innergeldie, Comrie. Fourth—Commended. A. & A. Macdonald, Shirvabeg, Laggan, Kingussie.
10. Best Dinmont or Shearling Tup—L.10 to John Archibald, Overshiels, Stow. Second. L.5 to John Archibald, Overshiels, Stow. Third. The bronze medal to John Archibald, Overshiels, Stow. Fourth—Commended. John Malcolm of Poltalloch, Callton Mor, Lochgilphead.
11. Best Five Ewes, not above 4 shear, with Lambs at foot—L.8 to John Malcolm, of Poltalloch, Lochgilphead. Second. L.4 to A. C. Pagan, Innergeldie, Comrie. Third. The bronze medal to James Macpherson, Drumore, Ardersier. Fourth—Commended. A. & A. Macdonald, Shirvabeg, Laggan, Kingussie.
    Best Pen of Lambs—The silver medal to James Macpherson, Drumore, Ardersier. Second—Commended. John Malcolm of Poltalloch, Lochgilphead.
12. Best Five Shearling Ewes or Gimmers—L.8 to Thomas Murray, Eastside, Penicuik. Second. L.4 to John Archibald, Overshiels, Stow. Third. The bronze medal to John Malcolm of Poltalloch, Lochgilphead. Fourth—Commended. Allan Pollok, Ronachan, Clachan, Cantire.

SOUTHDOWN.

Judges—ROBERT ELLIOT, Laighwood, Dunkeld; WILLIAM GOODLET, Bolshan, Arbroath.

Attending Members—J. F. MACKENZIE of Allan Grange; and JOHN FERGUSON, East Grange.

13. Best Tup not above 4 shear—L.10 to James Bruce, Burnside, Fochabers. Second. L.5 to D. R. Williamson of Lawers, Crieff. Third. The bronze medal to Robert Scot Skirving, Camptoun, Drem. Fourth—Commended. Robert Scot Skirving, Camptoun, Drem.
14. Best Five Ewes not above 4 Shear, or Gimmers—L.8 to Robert Scot Skirving, Camptoun, Drem. Second. L.4 to James Bruce, Burnside, Fochabers. Third. The bronze medal to Robert Scot Skirving, Camptoun, Drem. Fourth—Commended. James Bruce, Burnside, Fochabers.

LONG WOOLLED OTHER THAN LEICESTER.

Judges.—The same as those for Leicesters.

15. Best Tup, not above 4 shear—L.10 to Thomas Beale Browne, of Salperton Park, Andoversford, Gloucester. Second. L.5 to Walter Reid, Drem. Third. The bronze medal to Thomas Beale Browne of Salperton Park. Fourth—Commended. John Gibson, Woolmet, Dalkeith.
16. Best Five Ewes, not above 4 shear, or Gimmers—L.8 to Thomas Beale Browne of Salperton Park. Second. L.4 to John Gibson, Woolmet, Dalkeith. Third. The bronze medal to Robert Scot Skirving, Camptoun, Drem. Fourth—Commended. Robert Scot Skirving, Camptoun, Drem.

In this Class a Special Premium of L.10 was awarded to Jonathan Peel, Knowlemere Manor, Clitheroe, Lancashire, for a Tup and 5 Gimmers of the Lonk breed.

SHORT-WOOLLED OTHER THAN SOUTHDOWN.

Judges—The same as those for Southdowns.

17. Best Tup, not above 4 shear—L.10 to Andrew Ralston, for the Glamis Trustees, Glamis. Second. L.5 to John Gibson, Woolmet, Dalkeith. Third. The bronze medal to John Gibson, Woolmet, Dalkeith.
18. Best Five Ewes, not above 4 shear, or Gimmers—L.8 to Andrew Ralston, for the Glamis Trustees, Glamis. Second. L.4 to John Gibson, Woolmet, Dalkeith. Third. The bronze medal to Andrew Ralston, for the Glamis Trustees.

CROSS.

Judges—The same as those for Cheviots.

19. Best Five Shearling Wethers, of any cross—L.6 to John Hunter, Dipple, Fochabers. Second. L.3 to Alexander Ronaldson, Little Gight, Methlic. Third. The bronze medal to Sir A. P. Gordon Cumming, Bart. Fourth—Commended. Sir A. P. Gordon-Cumming, Bart.
20. Best Five Lambs, of any cross—L.4 to A. and A. Cowan, Inverness. Second. L.2 to Edward Tew, Coul Cottage, Alness. Third. The Bronze medal to John Ferguson, East Grange, Forres. Fourth—Commended. Sir Kenneth S. Mackenzie of Gairloch, Bart., Conan House, Dingwall.

EXTRA SHEEP.

Silver medals were awarded to:—David Mundell, Auchindrean, Dingwall, for a Cheviot Tup; Sir Alexander P. Gordon-Cumming of Altyre, Bart., Forres, for 5 Blackfaced Wethers; James Stewart, Aberdeen, for 5 Blackfaced Wethers; James Stewart, Aberdeen, for 5 Blackfaced Wethers.

CLASS IV.—SWINE.

Judges—ROBERT ANDERSON of Lochdhu, Nairn; THOMAS BEGBIE, Queenston Bank, Drem; JOHN B. DUDGEON, Crakaig, Helensburgh.

Attending Member—JOHN BINNING, Brae.

Section.

1. Best Boar, large breed—L.8 to Andrew Ralston, for the Glamis Trustees, Glamis. Second. L.4 to James Reid, Lunatic Asylum, Elgin. Third. The bronze medal to Donald Cameron of Lochiel, Fort-William. Fourth — Commended. Thomas D. Findlay, Easterhill, Glasgow.

2. Best Boar, small breed—L.8 to John Laing, Glendeuglie, Kinross. Second. L.4 to William Stephen, Inchbroom, Elgin. Third. The bronze medal to Colonel Fraser-Tytler of Aldourie, Inverness. Fourth—Commended. Dudley Coutts Marjoribanks of Guisachan, M.P., Beauly.
3. Best Sow, large breed—L.6 to Thomas D. Findlay, Easterhill, Glasgow. Second. L.3 to Captain A. M. Clarke, Meddat, Parkhill, Ross-shire. Third. The bronze medal to His Grace the Duke of Hamilton and Brandon. Fourth—Commended. John Baillie Baillie of Leys, Inverness.
4. Best Sow, small breed—L.6 to John Laing, Glendeuglie, Kinross. Second. L.3 to William Stephen, Inchbroom, Elgin. Third. The bronze medal to Alexander Simpson, Seafield, Inverness. Fourth—commended. Thomas D. Findlay, Easterhill, Glasgow.
5. Best Pen of Three Pigs, not exceeding eight months old, large breed—L.4 to Lord Kinnaird, Rossie Priory, Inchture. Second. L.2 to the Duke of Hamilton and Brandon. Third. The bronze medal. *No Entry.*
6. Best Pen of Three Pigs, not exceeding eight months old, small breed—L.4. *No Competition.* Second. L.2. *No Entry.*

EXTRA SWINE.

Silver medals were awarded to:—Thomas D. Findlay, Easterhill, Glasgow, for a Boar small breed 1st Prize at Stirling, 1864; James Gordon of Manar, Keith, for Three Sow Pigs, small breed.

SHEPHERD'S DOGS.

Judges—ALEXANDER K. MACKINNON, Corry, Broadford; DONALD MACLEOD, Coulmore, Inverness.

Section.

1. Best Dog not exceeding six years old—L.2 to Henry Little, Hunters' Hall, Lauder. Second. L.1 to James Macbean, Barinsdale, Fort-Augustus. Third—Commended. Captain John Fraser of Balnain, Farraline, Gorthlick.
2. Best Bitch not exceeding six years old—L.2 to John Sinclair, Kintessack, Forres. Second. L.1. *No Entry.*

CLASS V.—POULTRY.

Judges—JOHN GIBSON, Woolmet, Dalkeith; JAMES WILSON, Wester Cowden, Dalkeith.

Attending Member—ROBERT PATERSON of Birthwood.

Section.

1. Best Coloured Dorking Cock and Two Hens—The silver medal to Thomas Knowles, jun., Aberdeen. Second. The bronze medal to John Maccallum, Hosh Distillery, Crieff.
2. Best Coloured Dorking Cockerel and Two Pullets—The silver medal to John Maccallum, Hosh Distillery, Crieff. Second. The bronze medal to James Clark, Railway Station, Fochabers. Third—Commended. Thomas Knowles, jun., Aberdeen.
3. Best White Dorking Cock and Two Hens—The silver medal to D. R. Williamson of Lawers, Crieff. Second. The bronze medal to D. R. Williamson of Lawers, Crieff.
4. Best White Dorking Cockerel and Two Pullets—The silver medal to D. R. Williamson of Lawers, Crieff. Second. The bronze medal. *No Entry.*

5. Best Coloured Cochin-China Cock and Two Hens—The silver medal to Thomas Knowles, jun., Aberdeen. Second. The bronze medal. *No Entry.*
6. Best Cochin-China Cockerel and Two Pullets—The silver medal. *No Entry.*
7. Best White Cochin-China Cock and Two Hens—The silver medal to Miss Biggar, Braes House, Ecclefechan.
8. Best White Cochin-China Cockerel and Two Pullets—The silver medal to George Tawse, Millbrae House, Helensburgh. Second. *No Entry.*
9. Best Bramahpootra Cock and Two Hens—The silver medal to John Laing, Glendeuglie, Kinross. Second. The bronze medal to Mrs. Matheson of Ardross, Alness.
10. Best Bramahpootra Cockerel and Two Pullets—The silver medal to John Laing, Glendeuglie, Kinross. Second. The bronze medal to Sir Kenneth S. Mackenzie of Gairloch, Bart., Conan House, Dingwall.
11. Best Malay Cock and Two Hens—The silver medal. *No Entry.*
12. Best Malay Cockerel and Two Pullets—The silver medal. *No Entry.*
13. Best Spanish Cock and Two Hens—The silver medal to Thomas Knowles, jun., Aberdeen. Second. The bronze medal to John Baillie Baillie of Leys, Inverness.
14. Best Spanish Cockerel and Two Pullets—The silver medal to Miss Biggar, Braes House, Ecclefechan. Second. The bronze medal. *No Entry.*
15. Best Golden Hamburg Cock and Two Hens—The silver medal to Samuel Pope, Aberdeen. Second. The bronze medal to John Muirhead, Saltoun Mains, Tranent.
16. Best Golden Hamburg Cockerel and Two Pullets—The silver medal. *No Competition.*
17. Best Silver Hamburg Cock and Two Hens—The silver medal to W. H. Wooley, Upper Hermitage, Leith. Second. The bronze medal to John Muirhead, Salton Mains, Tranent.
18. Best Silver Hamburg Cockerel and Two Pullets—The silver medal to John Muirhead, Saltoun Mains, Tranent. Second. The bronze medal to James Robertson, Kintore, Keith-hall.
19. Best Polish Cock and Two Hens—The silver medal. *No Entry.*
20. Best Polish Cockerel and Two Pullets—The silver medal to Samuel Pope, Aberdeen. Second. The bronze medal. *No Entry.*
21. Best Game Cock and Two Hens—The silver medal to D. C. Marjoribanks of Guisachan, M.P., Beauly. Second. The bronze medal to Mrs. Rennet, Aberdeen.
22. Best Game Cockerel and Two Pullets—The silver medal to Mrs. Rennet, Aberdeen. Second. The bronze medal. *No Entry.*
23. Best Cock and Two Hens, any other breed—The silver medal to John Mann, Meadowfield, Nairn.
24. Best Cockerel and Two Pullets, any other breed—The silver medal. *No Entry.*
25. Best Bantams, Cock and Two Hens—The silver medal to William J. Routledge, Aberdeen. Second. The bronze medal to Sir George Macpherson-Grant of Ballindalloch, Bart., Ballindalloch. Third—Commended. David Ainslie of Costerton, Blackshiels.
26. Best Bantams, Cockerel and Two Pullets—The silver medal to David Ainslie of Costerton, Blackshiels. Second. The bronze medal to Sir George Macpherson-Grant, Bart., of Ballindalloch.
27. Best Capons, three of any breed—The silver medal. *No Entry.*
28. Best White Aylesbury Drake and Two Ducks—The silver medal

Mrs. Hendrie, Castleleathers, Inverness. Second. The bronze medal to Thomas Knowles, jun., Aberdeen.

29. Best Rouen Drake and Two Ducks—The silver medal to D. C. Marjoribanks of Guisachan, M.P., Beauly. Second. The bronze medal. *No entry.*

30. Best Drake and Two Ducks, any other breed—The silver medal to John Baillie Baillie of Leys, Inverness. Second. The bronze medal. *No Award.*

31. Best Black Norfolk Turkey Cock and Two Hens—The silver medal. *No Award.* Second. The bronze medal. *No Entry.*

32. Best Turkey Cock and Two Hens, any other breed—The silver medal to Sir Kenneth S. Mackenzie of Gairloch, Bart., Conan House, Dingwall. Second. The bronze medal to Lord Lovat, Beaufort Castle, Beauly.

33. Best Gander and Two Geese—The silver medal to Sir Kenneth S. Mackenzie of Gairloch, Bart., Conan House, Dingwall. Second The bronze medal to Lord Lovat, Beaufort Castle, Beauly.

III.—DISTRICT COMPETITIONS.

CATTLE.

The County of Ayr.

Bulls	J. N. Fleming, Kilkerran, Maybole	Silver Medal.		
Bulls, Class I.[*]	1. William Donald, Sornbeg, Galston	L.7	0	0
	2. Thomas Craig, Onthank, Kilmarnock	4	0	0
Bulls, Class II.[†]	David Greig, Brownhills, Beith	6	0	0
Heifers	1. William Dunn of Dalmore, Stair	5	0	0
	2. John Gebbie, Nowbyre, Galston	3	0	0

The County of Renfrew.

Bulls	Alexander Graham of Capellie, Barrhead	Silver Medal.		
Bulls, Class I.	1. Jas. Mitchell, Blackhouse, Kilbarchan	L.3	10	0[‡]
	2. Robert Park, Hatton, Erskine	2	0	0[‡]
Bulls, Class II.	Robert Wilson, Forehouse, Kilbarchan	6	0	0
Heifers	1. James Lylo, Ditch, Erskine	5	0	0
	2. Robert Wilson, Forehouse, Kilbarchan	3	0	0

The District of Strathbogie.

Bulls	Miss Wilson of Auchaber, Huntly	Silver Medal.		
Bulls, Class I.	1. James Bruce, Burnside, Fochabers	L.7	0	0
	2. Walter Scott, Glendronach, Huntly	4	0	0
Bulls, Class II.	Walter Scott, Glendronach, Huntly	6	0	0
Heifers	1. Walter Scott, Glendronach, Huntly	5	0	0
	2. Alexander Joss, Cruichy, Huntly	3	0	0

The County of Stirling.

Heifers	1. James Jardine, Kilewan, Fintry	5	0	0
	2. George Pender, Dumbreck, Kilsyth	3	0	0

The District of Strontian.

Bulls	Sir Thomas M. Riddell, Bart., Strontian,	Silver Medal.		
Bulls, Class I.	1. Donald M'Vean, Salachan, Ardgour	L.3	10	0[‡]
	2. A. Kirkpatrick, Drimantorin, Strontian	2	0	0[‡]

[*] Class I., Bulls calved before 1st January, 1863.

[†] Class II., Bulls calved after 1st January, 1863.

[‡] Half Premiums awarded, the number of lots being under six.

Heifers .	1. A. Cameron, Glenforslan, Kinlochmoidart	2	10	0*
	2. Donald M'Vean, Salachan, Ardgour	1	10	0*

The District of Formartine.

Bulls . .	John Duncan of Asleed, Tarves	Silver Medal.		
Bulls, Class I. .	1. Amos Cruickshank, Sittyton, Aberdeen	L.7	0	0
	2. William S. Marr, Upper Mill, Tarves	4	0	0
Bulls, Class II.	William S. Marr, Upper Mill, Tarves .	6	0	0
Heifers .	1. Amos Cruickshank, Sittyton, Aberdeen	5	0	0
	2. William S. Marr, Upper Mill, Tarves	3	0	0

The District of the Perth, Fife, Kinross, and Clackmannan Association.

Bulls . .	David R. Williamson of Lawers, Crieff	Silver Medal.		
Bulls, Class I. .	1. J. Dryburgh, Kininmont, Cupar Fife	L.3	10	0*
	2. Alexander Bethune of Blebo, Cupar Fife	2	0	0*
Bulls, Class II.	G. Robertson Barclay of Keavil, Dunfermline	6	0	0

DRAUGHT HORSES.

The District of the Perth, Fife, Kinross, and Clackmannan Association.

Stallions .	Andrew Logan, Crossflat, Kilbarchan .	L.25	0	0
Mares .	Robert Mowbray, Cambus, Stirling .	10	0	0
Fillies .	William Syme, Craigie, Leuchars .	5	0	0

ENTIRE COLTS.

The County of Lanark.

1 year old Colts	Robert M'Kean, Lumloch, Bishopbriggs	L.4	0	0

The County of Linlithgow.

1 year old Colts	Robert Arklay, Philpston, Linlithgow .	2	0	0*

The County of Edinburgh.

1 year old Colts	Samuel Jack, Dreghorn Mains, Colinton	2	0	0*

LEICESTER SHEEP.

The Stewartry of Kirkcudbright.

Tups . .	John Murdoch of Sunnyhill, Dumfries	Silver Medal.		
Tups . .	Jas. Mitchell, Little Knox, Castle Douglas	L.5	0	0
Shearling Tups	James Bruce, Auchengoul, Kirkcudbright	5	0	0
Ewes . .	James Shennan, Balig, Kirkcudbright .	5	0	0
Shearling Ewes	John Mackenzie, Barnhill, Dumfries .	4	0	0

CHEVIOT SHEEP.

The District of Mull, Coll, and Tyree.

Tups . .	Walter Elliot, Scour, Oban .	Silver Medal.		
Tups . .	Walter Elliot, Scour, Oban . .	L.5	0	0
Shearling Tups	E. B. Thorburn, Isle of Muck, Tobermory	5	0	0
Ewes . .	E. B. Thorburn, Isle of Muck, Tobermory	5	0	0
Shearling Ewes	E. B. Thorburn, Isle of Muck, Tobermory	4	0	0

SWINE.

The District of Alford.

Boars .	C. J. Bruce, Waltheton, Keig, Aberdeen,	Silver Medal.		

* Half Premiums awarded, the number of lots being under six.

BOARS .	1. And. Wilson, Whiteside, Tullynessle,	L.4	0	0
	2. Robert Wilson, Lethenty, Tullynessle,	2	0	0
SOWS .	1. William Paterson, Whiteley, Whitehouse,	3	0	0
	2. Andrew Wilson, Waterside, Forbes,	1	0	0

The District of Dalkeith.

BOARS .	The Duke of Buccleuch, K.G., .	Silver Medal.		
BOARS .	1. Jos. Stewart, Bangholm, Edinburgh	L.2	0	0*
	2. Thomas Watson, Esperston, Gorebridge,	1	0	0*
SOWS	1. John Curror, Comiston, Lothian Burn,	3	0	0
	2. John Gibson, Woolmet, Dalkeith, .	1	0	0

DAIRY PRODUCE.

The County of Lanark.

CURED BUTTER	A. Gilmour, Crosshill, East Kilbride,	Silver Medal.		
CURED BUTTER	1. A. Lithgow, Drumhall, Glassford, .	L.3	0	0
	2. G. Donald, Ellenbank, Lesmahagow,	2	0	0
SWEET MILK CHEESE	1. W. Cochran, Cleuchearn, East Kilbride,	3	0	0
	2. A. Cochran, Craig, Avondale, .	2	0	0

The Western District of Mid-Lothian.

CURED BUTTER	1. James Walker, Tippet Hill, Bathgate,	L.3	0	0
	2. D. Black, New Year Field, Livingstone,	2	0	0

The Lower Ward of Renfrewshire.

CURED BUTTER	1. Matthew Scott, Denniston, Kilmalcolm,	L.3	0	0
	2. Alex. Graham, Newton, Kilmalcolm,	2	0	0

The District of Kilmarnock.

Medium Gold Medals were awarded to:—

James Hannay, Bower to James A. White, Kirkmabeck, Stranraer, for Sweet Milk Cheese.

James Pollock, West Raws, Kilmarnock, for Sweet Milk Cheese.

SEED COMPETITIONS.

Silver Medals were awarded to:—

The County of Ayr.

Thomas Bone, East Sanquhar, St. Quivox, for Chevalier Barley.
John Barr, Harperland, Dundonald, for Tom Findlay Oats.
James Pollock, West Raws, Kilmarnock, for Ryegrass Seed.

The County of Stirling.

John Blair, Clayhills, Stirling, for Common Barley.
Neil M. M'Ewen, Hill of Drip, Stirling, for Sandy Oats.
Thomas Murdoch, Westwood, Stirling, for Scotch Beans.
Michael Carmichael, Raploch, Stirling, for Yellow Essex Wheat.

The District of Wester Ross.

Sir William Mackenzie of Coul, Bart., for Chevalier Barley.
William Lairg, Somerley, Dingwall, for Sandy Oats.
Murdo Bethune, Dreim, Beauly, for Perennial Ryegrass Seed.

The District of the Black Isle.

Donald Mackay, Kessock, for Chevalier Barley.
Donald Mackay, Kessock, for Potato Oats.

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* Half Premiums awarded, the number of lots being under six.

The County of Caithness.

John Rinder, Junior, Barrogill, Wick, for Common Bere.
Alexander Adam of Lynegar, Wick, for Scotch Birley Oats.

The Islands of Shetland.

George Bruce, Veensgarth, Lerwick, for Potato Oats.
George Bruce, Veensgarth, Lerwick, for Caithness Bere.
John Walker, Maryfield, Bressay, for Perennial Ryegrass Seed.

The District of Spey, Avon, and Fiddochside.

Dr Alexander Creyk, Georgetown, Ballindalloch, for Common Barley.
Alexander Paterson, Mulben, Keith, for Potato Oats.

The District of Strathearn.

John Whyte, Muirhead, Dunning, for Potato Oats.

PLOUGHING COMPETITIONS.

In the course of the year 1864-1865, the Society's Medal was awarded at 145 Ploughing Competitions, the details of which are given at p. 213.

MEDALS IN AID OF PREMIUMS GIVEN BY LOCAL SOCIETIES.

Silver Medals were awarded to the following:—

The Islands of Shetland.

George Bruce, Veensgarth, Lerwick, for Cow.
Mrs Simon Anderson, Setter, Bressay, for Cured Butter.
Mrs James Jaffray, Belmont, Unst, for Sweet Milk Cheese.

The County of Forfar.

William Goodlet, Bolshan, Arbroath, for Leicester Tup.
William Goodlet, Bolshan, Arbroath, for Best Lot of Sheep.

The County of Peebles.

John Archibald, Overshiels, for Cheviot Tup.

The Western District of Mid-Lothian.

Wylie & Hamilton, Overton, Wishaw, for Ayrshire Bull.
David M'Gibbon, Inveravon, Polmont, for Draught Mare.

The District of Penicuik.

William Anderson, Newbigging, Lasswade, for Shorthorn Bull.
Thomas Stevenson, Mount Lothian, Penicuik, for Cheviot Ewe Lambs.

The District of Buchan.

William Henderson, Mill of Craigellie, for Shorthorn Bull.
Thomas Milne, Shevado, for Shorthorn Cow.

The District of Kilmarnock.

William Donald, Sornbeg, Galston, for Ayrshire Bull.
Thomas Craig, Onthank, Kilmarnock, for Ayrshire Cow.

The District of Fettercairn.

John Smith, Balmain, Fettercairn, for Shorthorn Bull.
Archibald Henderson, Blackiemuir, Laurencekirk, for Green Crop.

The District of Cumnock.

Charles Stewart, Cooperhill, Ochiltree, for Ayrshire Bull.
John Craig, Guelt, Cumnock, for Ayrshire Cow.
James Clark, Common, Auchinleck, for Sweet Milk Cheese.

The District of Sanquhar.

H. B. D. Hyslop, Tower, Kirkconnel, for Ayrshire Bull.
T. B. Martin, Muiryhill, Thornhill, for Ayrshire Cow.
James Campbell, Knockenjig, Sanquhar, for Sweet Milk Cheese.
Thomas M'Kie, Burnfoot, Sanquhar, for Collection of Roots.
Mrs Douglas, Eliock, Sanquhar, for Cured Butter.

The District of Leochel-Cushnie.

Henry Gray, Mains of Cushnie, for Shorthorn Bull.
Hary Shaw, Bogfern, Tarland, for Polled Cow.
William M'Combie, Bridgend, for Green Crop.

The Island of Bute.

Daniel Macfie, Ballicaul, for Ayrshire Bull.
John Stewart, Upper Ardroscadale, for Ayrshire Cow.
Robert Stewart, Nether Ardroscadale, for Green Crop.

The District of Stewarton.

John Brown, Kirkmuir, for Ayrshire Bull.
Alexander Harvey, Auchintibber, for Ayrshire Cow.
Robert Stevenson, Gilmill, for Sweet Milk Cheese.

The District of Galston.

Andrew Young, Burntwood Hill, for Ayrshire Bull and Cow.

The District of the Cluny Association.

James Donald, Waulkmill, Cluny, for Shorthorn Bull.
James Donald, Waulkmill, Cluny, for Shorthorn Cow.
William Milne, Tillycairn, Cluny, for best-managed Farm.
William Downie, Linton, Cluny, for Green Crop.

The County of Inverness.

Robert Gentle, Dell, Inverness, for laid Cheviot Washed Wool.
Alexander Fraser, Barrisdale, for laid Blackfaced unwashed Wool.
Capt. John Fraser, of Balnain, Inverness, for white Cheviot Hogg Wool.
James Arres, Woodside, Culloden, for laid Cross washed Wool.

The County of Nairn.

A. F. M'Lennan, Meikle Urchany, for best-managed Farm.

The County of Kincardine.

Robert Salmond, Nether Balfour, Durris, for Green Crop.

The District of Mauchline.

Mrs Borland, Mauchline Mains, for best-managed Dairy.

The County of Clackmannan.

William Sime, Orchard, Alva, for best-managed Carse Farm.
Walter Wylie, Parkhead, Alloa, for best-managed Dry-field Farm.
John Peat, Manor, Stirling, for best-made Hay.

The District of Spey, Avon, and Fiddochside.

William Cantlie, Keithmore, Dufftown, for best-managed Farm.

The District of Nithsdale.

James Campbell, Knockenjig, Sanquhar, for Sweet Milk Cheese.
George Douglas, Eliock Grange, Sanquhar, for Cured Butter.

The District of Broughton.

John White, Howburn, for Cured Butter.

Forres Fat Show.

Richard H. Harris, Earnhill, Forres, for Bullock.
Sir Alex. P. Gordon-Cumming of Altyre, Bart., for Heifer.
Sir Alex. P. Gordon-Cumming of Altyre, Bart., for best pen of Sheep.
Richard H. Harris, Earnhill, Forres, for Pig.

COTTAGES AND GARDENS.

FOR THE BEST-KEPT COTTAGES AND GARDENS.

First Cottage Premium, L.1 5s., and Medal when Four Competitors; Second, L.1; Third, 15s. First Garden Premium, L.1 5s., and Medal when Four Competitors; Second, L.1; Third, 15s.

Parish of Leochel-Cushnie.—1st Cottage Premium and Medal, George Edward; 2d, William Reid; 3d, Charles Birss. 1st Garden Premium and Medal, George Edward; 2d, William Mortimer; 3d, Joseph Durward.

Parish of Birse.—1st Cottage Premium and Medal, Alexander Birss; 2d, William Ritchie; 3d, John Collie. 1st Garden Premium and Medal, John Collie; 2d, Alexander Bowman; 3d, George Birss.

Parish of Forgandenny.—1st Garden Premium and Medal, Alexander Nicholson; 2d, Thomas Duncan; 3d, Thomas M'Ewan.

Parish of Markinch.—1st Garden Premium and Medal, Robert Galloway; 2d, Alexander Matthew; 3d, William Matthew.

MEDALS GIVEN IN AID OF PRIVATE COMPETITIONS.

Logiealmond and Glenalmond.—John Carmichael, for best Cottage Garden.

Ballindalloch.—Alexander Mackay, for best kept Cottage.

Abernethy.—George Spence, for best Cottage Garden.

Hutchesonton Gardens.—A. Clelland, Glasgow, for best kept Plot.

Victoria Gardens, Govanhill.—James Thomas, Glasgow, for best kept Plot.

VETERINARY COLLEGE.

Silver Medals were awarded, at the Annual Examination in April last, to the following:—

1. Alexander Lockhart, Glasgow, for best Examination in Horse Pathology.
2. George Young, Haddington, for best Examination in Cattle Pathology.
3. Thomas Sharpe, Hamilton, for best Examination in Anatomy.
4. Alexander Butters, Edinburgh, for best Examination in Physiology.
5. Alexander E. M'Gillivray, Bonnyton, Rayne, Aberdeenshire, for best Examination in Chemistry.
6. Thomas Sharpe, Hamilton, for best Examination in Materia Medica.
7. James Mitchell, Kelso, for best Anatomical Preparation.
8. Alexander Butters, Edinburgh, for best General Examination.

Jn. Hall Maxwell, *Secretary.*

Edinburgh, *December*, 1865.

PLOUGHING COMPETITIONS REPORTED TO THE SOCIETY IN 1864-65.

Name of Society.	Place of Competition.	Date.	No. of Ploughs.	Extent.	Time.	Amount of Premiums. £ s. D.	First Premium and Silver Medal Awarded to.
ABERDEENSHIRE.							
1. Ballater	Milton of Bracklay	9th Mar., 1865	21	½ acre	5 hours	3 12 6	James Coutts, Dorsincilly
2. Buchan (Deer district)	Aulditown of Coynach	14th Dec., 1864	52	Rate of 1 acre	18 hours	3 18 6	John Brown, Lenabo
3. Buchan (Fraserburgh dist.)	Mains of Philorth	15th Dec., 1864	46	½ acre	4½ hours	3 0 6	William Morrice, Redbog
4. Countesswells	Foggitown	18th Dec., 1864	22	1 rood 9 poles	3¾ hours	4 10 0	Robert Fraser, Bishop-dams
5. Coldstone and Migvie	Blelack	5th Dec., 1864	55	1 rood 20 poles	5 hours	6 5 0	William Esson, Daugh
6. Forbes and Fordyce	Helenamore	22d Dec., 1864	24	½ acre	4 hours	3 1 6	Wm. Chapman, Woodhead
7. Newhills	Overhills	15th Dec., 1864	28	1 rood 20 poles	4 h. 15 min.	3 0 0	Alexander Reith, Greenburn
8. Old Machar	Middleton of Scotstown	14th Dec., 1864	33	1 rood 25 poles	5 hours	5 5 0	Wm. Gall, Upper Bodachra
9. Strathbogie	Coniecleugh	3d March, 1865	46	½ acre	5 hours	6 0 0	James Merson, Craigwillie
10. Strichen	Redbog	19th Jan., 1865	34	½ acre.	4 h. 10 min.	3 0 6	William Henderson, Little Hillhead
ARGYLESHIRE.							
11. Islay, Colonsay, and Jura	Bridgend, Islay	8th Mar., 1865	19	½ acre	5 hours	3 13 0	Jas. Macfadyen, Gruinart
12. Kilfinan	Corra, Airdlamont	1st Mar., 1865	21	½ acre	5 hours	3 6 0	Alexander Speirs, Otter
13. Killean and Kilcalmonell	Tayinloan	1st Mar., 1865	31	55 falls	4 h. 7½ min.	5 10 0	Alex. M'Kinnon, Ballone
14. Killean and Kilkenzie	Amod	28th Feb., 1865	13	½ acre	5 hours	3 0 0	Mathew Stewart, Killmalna
15. Kintyre	Ballebrennan	3d Feb., 1865	28	55 falls	4 h. 7½ min.	4 7 6	John Gemmell, Dalhioch
16. Lorn	Gannaven	9th Mar., 1865	18	1 rood 10 poles	5 hours	3 0 0	Dug. Cowan, Gylen, Kerrera
17. Nether Lorn	Auchnasaul	10th Mar., 1865	16	½ acre	6 hours	4 2 0	Donald Connell, Ardmaddy
18. Poltalloch	Nether Largie	9th Mar., 1865	27	½ acre	5 hours	3 16 0	Dug. M'Alpine, Ballimore
AYRSHIRE.							
19. Ardrossan	Chapelhill	2d Mar., 1865	29	1 rood	4 hours	3 10 0	Robert Miller, Mayfield
20. Ayr Parish	Montfergusson	2d Mar., 1865	19	Rate of 1 ac. Scot.	16 hours	3 17 6	Robert Paton, Frees
21. Barskinning and Fowler	Stairaird	11th Jan., 1865	18	2 roods 16 poles	5½ hours	4 8 0	Robert Mitchell, Fowler
22. Carrick	Knockdon	7th Jan., 1865	35	1 rood 8 poles	3½ hours	3 15 0	Alex. Anderson, Jun., Burneil

PLOUGHING COMPETITIONS REPORTED TO THE SOCIETY IN 1864-65.

Name of Society.	Place of Competition.	Date.	No. of Ploughs.	Extent.	Time.	Amount of Premiums. £	s.	D.	First Premium and Silver Medal Awarded to.
AYRSHIRE—(*Continued*).									
23. Colmonell	Capston	17th Mar., 1865	17	1 rood 10 poles	3 hours	3	8	0	James Ross, Daljarrock
24. Cumnock	Crosshill	12th Jan., 1865	20	1 rood	4 hours	3	15	0	Robt. M'Neight, Barmickhill
25. Fenwick	High Todhill	7th Mar., 1865	23	Rate of 1 ac. Scot.	16 hours	5	13	0	Robert Lindsay, Gardrum
26. Grougar	Milton	2nd Mar., 1865	15	1 rood 10 poles	4½ hours	4	6	0	David White, Caprickhill
27. Kirkmichael	Trochain	14th Jan., 1865	39	40 falls	4 hours	3	0	0	James M'Kie, Drumore
28. Kirkoswald	Morroston	25th Feb., 1865	34	½ acre	6 hours	3	5	6	Alex. Herron, Laigh Park
29. Kilmarnock	Greenhills, Kilmaurs	3rd Mar., 1865	32	1 rood 19 poles	5 hrs. 40 min.	5	2	6	Alex. Ferguson, Sidehead
30. Mauchline	Dykefield	28th Feb., 1865	21	½ acre	7 hours	3	12	0	William Wyllie, Mossgeil
31. New Cumnock	Whitehill	15th Mar., 1865	16	Rate of 1 ac. Scot.	16 hours	3	14	6	William Howat, Burnfoot
32. St. Quivox.	Auchencruive	8th Mar., 1865	18	60 falls	6 hours	4	7	6	Jn. Smith, Mossblown [Need.
33. Sorn and Dalgain	Westown	1st Mar., 1865	21	1 rood	4 hours	3	10	0	Jn. Merton, Laigh Burn o'
34. Tarbolton	East Carugillan	12th Jan., 1865	24	Rate of 1 acre	14 hours	4	11	6	James Walker, Springbank
BANFFSHIRE.									
35. Spey, Avon, and Fiddoch-side	Ballindalloch	8th Dec., 1864	23	2 roods	6 hours	3	10	0	Wm. Macdonald, Croftglass
BERWICKSHIRE.									
36. Chirnside	Oldcastles	9th Feb, 1865	18	Rate of 1 acre	9 hours	3	15	0	David Johnston, Causeway
37. Cockburnspath	Hoprig	16th Dec., 1864	34	3-5ths acre	6 hours	4	8	0	Wm. Trotter, Hoprig [Bank
38. Coldstream	Georgefield	15th Dec., 1864	29	5-6ths acre	6 hours	3	15	0	George Gibson, Skaithmuir
39. Dunse	Manderston Mains	30th Dec., 1864	20	5-8ths acre	8 hours	7	17	6	John Cockburn, Chapel
40. Eccles	Springwells	15th Dec., 1864	34	¾ acre	7½ hours	4	15	0	Alex. Dawson, Stonefold
41. Fogo	Sisterpath	23rd Dec., 1864	23	5-8ths acre	6½ hours	3	19	0	J. Brown, Sisterpath
42. Gordon	East Gordon	10th Dec., 1864	24	2-3rds acre	6½ hours	6	7	0	Ebenezer Hutton, Rumbleton
43. Kimmerghame	Kimmerghame Mains	22nd Dec., 1864	21	5-8ths acre	6½ hours	4	10	0	Jas. Darling, Kimmerghame Mains

PLOUGHING COMPETITIONS REPORTED TO THE SOCIETY IN 1864-65.

Name of Society.	Place of Competition.	Date.	No. of Ploughs.	Extent.	Time.	Amount of Premiums. £ s. D.	First Premium and Silver Medal Awarded to.
BERWICKSHIRE—(*Continued*).							
44. Lammermuir	Felldeugh	11th Jan., 1865	29	3-5ths acre	4½ hours	3 0 0	Ar. Paterson, Mid. Monynut
45. Legerwood	Westmorriston	13th Dec., 1864	23	⅓ acre	5 hours	3 16 0	David Thomson, Dods
46. Westruther	Hindside Hill	17th Dec., 1864	24	½ acre	5 hours	4 2 6	Wm. Barns, Bassendean Hill
BUTE AND ARRAN.							
47. Bute	Windyhall	2d March, 1865	39	Rate of 1 ac. Scot.	16 hours	8 11 6	Jn. Simpson, Largieorechtan
48. Arran	Clauchan	1st March, 1865	29	Rate of 1 ac. Scot	17 hours	5 8 6	Neil Ferguson, Brodick
CAITHNESS-SHIRE.							
49. Caithness	Stanstill	8th Mar., 1865	68	5-8ths acre	6 hours	5 5 0	John Phimster, Hempriggs
CLACKMANNANSHIRE.							
50. Logie and Lecroft	Manorneuck	29th Dec., 1864	21	Rate of 1 ac. Scot.	14 to 16 hrs.	4 2 6	Robert Hill, Broom
DUMBARTONSHIRE.							
51. Cardross	Pillanflat	13th Jan., 1865	16	Rate of 1 ac. Scot.	14 hours	6 7 6	Peter More, Camcron House
52. Dumbarton	Aitkenbarr	12th Jan., 1865	15	Rate of 1 ac. Scot.	16 hours	4 5 6	Alex. Brock, Netherboag
53. Kilmaronock and Bonhill	Badshalloch	10th Jan., 1865	18	1 rood 20 poles	4 hours	5 0 0	John Buchanan, Croftfoot
54. Kirkintilloch	Wallflat	2d March, 1865	17	Rate of 1 acre	13½ hours	8 6 0	Charles Stewart, Grayshill
DUMFRIESSHIRE.							
55. Applegirth	Fishbeck	10th Mar., 1865	15	2 roods 20 poles	6 hours	4 7 6	Jas. Watson, Hangingshaw
56. Canonbie	Mouldiehills	5th Jan., 1865	29	Rate of 1 acre	10 hours	7 13 6	Park Little, Burruscrofts
57. Dalton	Middleraw	6th Jan., 1865	20	2 roods	5 hours	5 2 6	John Kerrick, Hardgrave

PLOUGHING COMPETITIONS REPORTED TO THE SOCIETY IN 1864-65.

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						£	s.	d.	
DUMFRIESSHIRE—(*Continued.*)									
58. Kirkconnel	Nether Cairn	9th Dec., 1865	17	Rate of 1 rd. Scot.	4 hours	4	10	0	Jn. Hislop, M'Cririck's Cairn
59. Mouswald	Townhead	6th Mar., 1865	19	2 roods	5 hours	4	7	6	George Irving, Townfoot
60. Penpont	Floors	6th Jan., 1865	17	2 roods	5 hours	4	7	6	Andrew Telfar, Arkland
61. Upper Annandale	Annan Bank	7th Mar., 1865	31	2 roods	6 hours	6	12	6	John Ewart, Cleughbrae
62. Torthorwald	East Roucan	27th Dec., 1865	21	2 roods	5 hours	6	7	6	Robt. Nicholson, Hemplands
63. Westerkirk	Georgefield	17th Jan., 1865	20	2 roods	6 hours	4	17	0	David Telford, Potholm
EDINBURGHSHIRE.									
64. Borthwick	Harvieston	10th Jan., 1865	30	Rate of 1 acre	10 hours	4	10	0	Philip Leadbitter, Arniston
65. Carrington and Whitehill	Shewington	23rd Dec., 1864	31	2 roods	5 hours	5	0	0	Dav. Watt, Cappielaw [Mains
66. Cockpen and Newbattle	Wester Cowden	20th Dec., 1864	37	2 roods	6½ hours	6	6	6	Geo. Rutherford, Lingerwood
67. Currie	Buteland	7th Mar., 1865	40	Rate of 1 acre	7 hours	4	5	0	John Laurie, Buteland
68. Glencorse	Glencorse Mains	6th Jan., 1865	21	2 roods	3 hours	4	0	0	Andrew Borrowman, Cuicken
69. Inveresk	Carberry Hillhead.	27th Feb., 1865	25	¾ acre	7½ hours	3	12	0	Alex. Penicuik, Crookston
70. Lasswade	Moat	17th Dec., 1864	36	2 roods	6 hours	5	8	6	William Brown, Halls
71. Temple	Outerston	17th Dec., 1864	36	2 roods	5½ hours	3	11	6	William Tillie, Stobsmills
72. West Dist. of Mid-Lothian	Balgreen	3rd Mar., 1865	35	½ acre Scotch	7½ hours	5	0	0	George Law, Langton
ELGINSHIRE.									
73. Strathspey	Mullochard	4th Apr., 1865	34	2 roods	4½ hours	3	1	6	John M'Lean, Inverladren
74. Urquhart	Broomhill	9th Mar., 1865	30	2 roods	5½ hours	3	0	0	John Taylor, Tippertait
FIFESHIRE.									
75. Auchtermuchty	Reedieleys	12th Jan., 1865	30	2 roods	5 hours	3	3	0	David M'Queen, Pitlochrie
76. Crossgates	South Fod	16th Dec., 1864	32	2 roods	5 hours	3	15	0	David Adamson, Halbeath

PLOUGHING COMPETITIONS REPORTED TO THE SOCIETY IN 1864-65.

Name of Society.	Place of Competition.	Date	No of Ploughs	Extent.	Time	Amount of Premiums	First Premium and Silver Medal Awarded to.
FYFESHIRE—(*Continued.*)						£ s. D	
77. Dunnikier	Dothan	27th Jan., 1865	38	¾ acre	7½ hours	3 16 6	Thomas Brown, Cardenbarns
78. Dysart	Middle Balbeggie	29th Dec., 1864	37	2 roods	5 hours	3 12 6	George Fernie, Strathore
79. Largo	Cassingray	28th Dec., 1864	25	2 roods	5 hours	3 10 6	Archd. Lindsay, Branxton
80. Leslie	Strathendry	3d March, 1865	36	2 roods 20 poles	6 hours	3 16 0	John Walker, Macedonia
FORFARSHIRE.							
81. Tannadice and Oathlaw	Derachie	16th Dec., 1864	49	2 roods	5 hours	4 5 0	John Walker, Muiryhillock
HADDINGTONSHIRE.							
82. Dunbar, Spott, & Innerwick	Spott	21st Dec., 1864	32	Rate of 1 acre	10 hours	4 15 0	Robert Mitchell, Halls
INVERNESS-SHIRE.							
83. Inverness	Castle Heather	8th Mar., 1865	42	2 roods	5 hours	7 10 0	Chas. M'Intosh, Balnagaick
KINCARDINESHIRE.							
84. Durris	Boginwath	21st Dec., 1864	54	1-3rd acre	3 hrs. 20 min.	6 17 0	Jn. M'Hardy, West Funnach
85. Elsick	West Macduff	20th Dec., 1864	22	Rate of 1 acre	12 hours	4 15 0	James Paterson, Jellybrands
86. Glenbervie	Broombank	14th Dec., 1864	39	1 rood 24 poles	4 hours	3 3 0	James Muchart, Mains of Mondynes
87. Howe of the Mearns	Abbeyton	17th Dec., 1864	48	1 rood 24 poles	4 hours	5 0 0	James Cameron, Mains of Haulkerton
88. Maryculter	Tilburies	4th Jan., 1865	27	1-3rd acre	3½ hours	4 7 6	Alex. Walker, Westside
89. Marykirk	Oatyhill	22d Dec., 1864	32	2 roods	5 hours	4 5 0	William Watt, Muirton
90. Nigg	Cove Farm	27th Dec., 1864	30	2 roods	5 hours	7 14 6	Robert Forrest, Kincorth

PLOUGHING COMPETITIONS REPORTED TO THE SOCIETY IN 864-65.

Name of Society.	Place of Competition.	Date.	No. of Ploughs.	Extent.	Time.	Amount of Premiums £	s.	D.	First Premium and Silver Medal Awarded to.
KINCARDINESHIRE—(*Continued.*)									
91. Portlethen	Balquharn	7th Feb., 1865	30	Rate of 1 acre	10 hours	5	5	0	Wm. Wilson, Mains of Portlethen
92. Rickarton and Ury	Findlaystone	9th Dec., 1864	80	1 rood 9 poles	3 hours	9	18	0	Jn. Caird, Newbigging
STEWARTRY OF KIRKCUDBRIGHT.									
93. Glenkens	Shiel, Glenlee	22nd Dec., 1864	33	1 rood	4½ hours	4	7	6	John Morrin, Tower
94. New Abbey	Maryfield	6th Jan., 1865	26	1 rood 11 poles	3 hrs. 11 min.	5	15	0	John M'Myn, Martingirth
LANARKSHIRE.									
95. Biggar and Skirling	Biggarshields	17th Mar., 1865	39	½ acre Scotch	6½ hours	10	0	0	Jas. Dempster, South Mains
96. Cadder	Balornock	28th Feb., 1865	35	2 roods	5 hours	10	15	0	Archd. Mitchell, Balmuldy
97. East Kilbride	Newhouse Mill	6th Mar., 1865	25	2 roods	6 hours	9	0	0	William Cochran, Clochearn
98. New Monkland	Thrashbush	12th Jan., 1865	26	2 roods	8 hours	8	0	0	George Main, North Myvet
99. Old Monkland	Lumloch	3rd Mar., 1865	31	Rate of 1 acre	14 hours	9	0	0	Thos. Hinshelwood, Spindlehow
100. Wiston and Roberton	Chesterhall	7th Mar., 1865	17	2 roods	5 hours	5	7	0	Jas. Thom, Fallside
LINLITHGOWSHIRE.									
101. West Calder	Hay Mains	12th Jan., 1865	23	2 roods Scotch.	7½ hours	3	12	0	Andrew Grainger, Crofthead
102. West Lothian	Bridgend	2nd Mar., 1865	48	2 roods	6 hours	5	7	6	James Wardlaw, Balderston
NAIRNSHIRE.									
103. Nairnshire	Holme	13th Dec., 1864	48	2 roods	5 hours	3	10	0	Angus Robb, Milltown
ORKNEY.									
104. Shapinshay	Balfour Mains	21st Mar., 1865	19	2 roods	4½ hours	3	19	0	John Sinclair, Ness

PLOUGHING COMPETITIONS REPORTED TO THE SOCIETY IN 1864-65.

Name of Society.	Place of Competition.	Date.	No. of Ploughs.	Extent.	Time.	Amount of Premiums.			First Premium and Silver Medal Awarded to.
						£	s.	D.	
PEEBLES-SHIRE.									
105. Manor	Haswellsykes	20th Jan., 1865	17	2 roods 32 poles	7 hours	3	19	0	Gilbert Rae, Woodhouse
106. Peebles	Whitehaugh	9th Dec., 1864	24	¾ acre	7½ hours	4	6	0	Jn. Fraser, Nether Kidstone
PERTHSHIRE.									
107. Abernethy	Abernethy	10th Jan. 1865	24	2 roods	5 hours	3	16	0	David Low, Invernethy
108. Alyth and Airlie	Loyal Bank	15th Dec., 1864	49	2 roods	5 hours	9	2	0	George Low, New Craig
109. Ardoch	Keirallan	14th Mar., 1865	24	2 roods	5 hours	3	0	0	Peter Sharpe, Blueton
110. Auchterarder	Strathy	2d Mar., 1865	19	2 roods	5 hours	3	3	0	James Gow, Whitefold
111. Bannockburn	Moss-side	3d Mar., 1865	26	2 roods	5 hours	5	0	0	Alex. Donaldson, Coachfauld
112. Callander	Clash	7th Mar., 1865	15	¾ acre	7 hours	3	0	0	James Strang, Auchinlauch
113. Comrie & Upper Strathearn	Muirend	9th Mar., 1865	17	2 roods	5½ hours	4	4	0	George Ferguson, Miggar
114. Drummond Castle	Temple Mill	10th Mar., 1865	21	1 rood 20 poles	7 hours	3	9	0	Thos. Marshall, Templemill
115. Farg	Easterton	7th Mar., 1865	19	2 roods	5 hours	3	9	0	John Bousie, Fordle
116. Fassoway and Tullibole	Powmill of Aldie	1st March, 1865	23	Rate of 1 ac. Scot.	12 hours	3	6	0	Thos. M'Farlane, Craiglawhill
117. Gask	Hilton	1st March, 1865	21	2 roods	5½ hours	5	3	0	Wm. Campbell, Chapel Bank
118. Glenalmond	The Cairnies	15th Mar., 1865	18	2 roods 12 poles	6 hours	4	2	0	Henry Thomson, The Cairnies
119. Glengarry & Glenerrochy	Culvine	2d March, 1865	16	Rate of 1 acre	14 hours	5	10	6	John Campbell, Culvine
120. Kilmadock	Clarkton	2d March, 1865	23	Rate of 2 ac. Scot.	15 hours	3	18	6	Walter Balfour, Mansfield
121. Methven	Methven Castle	31st Dec., 1864	30	2 roods	6 hours	3	0	0	David Innes, Mains
122. Monzievaird and Strowan	Knockieston	17th Mar., 1805	21	2 roods	5 hours	6	1	6	Archd. M'Nie, Monzievaird
123. Porth of Monteith	Ballanucater	22d Dec., 1864	16	2 roods	6 hours	3	0	0	Daniel Robertson, Cardross
124. St. Martins	Friarton	9th Mar., 1865	32	¼ acre	7½ hours	5	9	0	Wm. Duff, St. Martin's Mill
125. Strathbraan	Meikle Trochree	28th Mar., 1865	16	2 roods 10 poles	7 hours	3	5	0	John Robertson, Trochree
126. Strathearn	Baldinnies	28th Feb., 1865	19	2 roods	6 hours	3	0	0	James M'Farlane, Cairnie
127. Weem	Castle Menzies	4th Mar., 1865	30	2 roods	4 hours	5	10	0	Alexander Menzies, Shenvail

PLOUGHING COMPETITIONS REPORTED TO THE SOCIETY IN 1864-65.

Name of Society.	Place of Competition	Date.	No of Ploughs.	Extent	Time	Amount of Premiums	First Premium and Silver Medal Awarded to
RENFREWSHIRE.						£ s D	
128. Cathcart and Eastwood	Giffnock	17th Jan., 1865	24	1 rood 20 poles	7 hours	5 5 0	Robert Kirkwood, Wardhill
129. Erskine	Rashiecrook	18th Jan., 1865	17	2 roods 10 poles	6½ hours	3 7 0	Thomas Lochead, Hatton
ROXBURGHSHIRE.							
130. Lilliesleaf	Dimpleknowe	16th Dec., 1864	40	2 roods 6 poles	6 hours	9 5 6	Andrew Pender, Tandlaw
131. Union	Graden	1st Mar., 1865	33	⅝ acre	6½ hours	14 15 3	Geo. Mullans, Marchcleuch
132. West Teviotdale	Ashybank	31st Mar., 1865	34	2 roods	5 hours	7 2 6	Walter Andison, Spittal
SELKIRKSHIRE.							
133. Melrose	Lindean	10th Dec., 1864	54	2 roods	5 hours	5 12 6	James Hume, Lilliesleaf
STIRLINGSHIRE.							
134. Blair Drummond	Meiklewood	28th Dec., 1864	26	Rate of 1 acre	12 hours	5 0 0	Andrew Ferguson, Westwood
135. Bucklyvie and Gartmore	Kepculloch	2nd Mar., 1865	15	¾ acre	7 hours	3 7 0	David M'Lay, Muirton
136. Craigforth and Touch	Old Croft, Touch	29th Dec., 1865	25	2 roods	6 hours	4 9 0	Wm Donochie, Whitehouse
137. Gargunnock	Dasherhead	1st Mar., 1865	22	Rate of 1 ac. Sco	13 hours	5 16 0	Robert Chrystal, Beild
138. Killearn and Lower Dist. of Strathendrick	Croy Cunningham	17th Jan., 1865	24	2 roods	7 hours	4 7 0	John Brown, Kilfeasst
139. Muiravonside	Castlehill	7th Mar., 1865	17	2 roods 20 poles	8¼ hours	8 11 6	James Newton, Knowhead
WIGTOWNSHIRE.							
140. Penningham, &c.	Upper Barr	7th Feb., 1865	40	2 roods	6½ hours	7 17 6	John Monteith, Mains of [Machermore
141. Inch	Sandmill	29th Dec., 1864	28	¼ acre Scotch	6¼ hours	4 10 0	Jn. M'Master, Little Genoch
142. Kirkmaiden	Logan Mains	31st Dec., 1864	53	2 roods	5 hours	4 7 6	Alex. M'Colm, Stockmill
143. Machers	Drumjargon	3rd Mar., 1865	41	27 poles	2¼ hours	4 10 6	James Agnew, Mulloch
144. Old Luce	Borland	11th Mar., 1865	81	¾ acre	7 hours	4 19 6	John Higgins, Borland
145. Stoneykirk	Balgreggan	27th Dec., 1864	76	2 roods	5 hours	5 16 0	William Grier, Craigencrosh

RETURNS OF SEED COMPETITIONS HELD IN 1865

DISTRICTS.	Seed exhibited in Competition by Growers to whom Silver Medals were awarded.		Number of Competitors.	Competitors to whom Silver Medals were Adjudged.		Produce per Imperial Acre.	Weight per Bushel.	Date of Sowing.	Date of Reaping.	Ground on which the Prize Seed was Grown.		
	Name of Species and Varieties.	Quant.		Name.	Residence.					Altitude.	Exposure.	Nature of Soil.
		Qrs.				Qrs.	Lbs.	1865	1865	Feet.		
Ayrshire, 28th Oct.,	Chevalier Barley	8	8	Thomas Bone	East Sanquhar, St, Quivox	6¼	58	22d Mar.	10th Aug.	64	South	Light loam on whinstone rock
	Tom Findlay Oats	2	8	John Barr	Harperland, Dundonald	5	41	5th April	28th Aug.	20		Till bottom earthy substance
	Perennial Ryegrass	2	2	James Pollock	West Raws, Kilmarnock	20 bush.	32	1864 May	15th July	250	North	Stiff clay
Stirling, 10th March and Oct. 13.	Common Barley	8	4	John Blair	Clayhills, Stirling	6	57½	7th April	1864 9th Aug.	100	South	Dryfield
	Sandy Oats	3	5	Neil M. M'Ewen	Hill of Drip, Stirling	6	45	26th Mar.	15th Sept.	13	South	Loamy
	Scotch Beans	3	2	Thomas Murdoch	Westwood, Stirling	4	65¼	21st Mar.	22d Sept.	20	South	Carse
	Yellow Essex Wheat	3	7	Michael Carmichael	Raploch, Stirling	5	62	12th Oct.	1865 10th Aug.	20	East	Carse
Wester Ross, 25th Feb.	Chevalier Barley	8	7	Sir Wm. Mackenzie, Bart.	of Coul, Dingwall	4	58¼	12th Apr.	1864 3d Sept.	100	South	Light black soil
	Sandy Oats	3	8	William Laing	Somerly, Dingwall	5½	43¼	3rd April	17th Sept.	480	South	Clay
	Perennial Ryegrass	2	3	Murdo Bethune	Dreim, Beauly	2	29¼	18th April	15th July	600	South	Light soil
Black Isle, Mar. 2.	Chevalier Barley	8	8	Donald Mackay	Kessock	5	70 oz.	6th Apr.	15th Aug.	50	South	Gravel
	Potato Oats	3	4	Donald Mackay	Kessock	7	46 12 oz	30th Apr	[illegible]th Aug.	70	South	Gravel
Caithness, Feb. 2.	Common Bere	3	4	John Rinder, jun	Barrogill, Wick	8	58¼	3rd May	13th Sept.	80	North	Sandy loam
	Scotch Birley Oats	3	8	Alexander Adam,	of Lynegar, Wick	5	44¼	7th Apr	18th Sept.	60	S.W.	Alluvial, wit clay subsoil
Shetland, Mar. 3.	Potato Oats	0	19	George Bruce	Veensgarth, Lerwick	3	44½	5th Apr.	17th Oct	15	North	Light loam, on lime stone
	Caithness Bere	0	7	George Bruce	Veensgarth, Lerwick	4	53	3rd May	4th Oct.	15	South	Light loam, on lime [stone
	Perennial Ryegrass	0	2	John Walker	Maryfield, Bressay	2	21	1863 19th May	20th July	70	West	Light loam
Spey, Avon, &c., Mar. 6.	Common Barley	8	2	Dr. Alex. Creyk	Georgetown, Ballindalloch	5	58	1864 20th Mar	5th Sept.	400	N.W.	Rich loam, with gravelly subsoil
	Potato Oats	3	5	Alexander Paterson	Mulben, Keith	6½	48¾	7th Apr.	20th Sept.	800	S.	Black loam on gravel bottom
Strathearn, Feb. 28.	Potato Oats	8	8	John Whyte	Muirhead, Dunning	4	45	11th Apr.	30th Aug	150	North	Gravelly

PREMIUMS OFFERED BY THE SOCIETY

IN

1866.

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GENERAL NOTICE.

The Highland Society was instituted in the year 1784, and established by Royal Charter in 1787. Its operation was at first limited to matters connected with the improvement of the Highlands of Scotland; but the supervision of certain departments, proper to that part of the country, having been subsequently committed to special Boards of Management, several of the earlier objects contemplated by the Society were abandoned, while the progress of agriculture led to the adoption of others of a more general character. The exertions of the Society were thus early extended to the whole of Scotland, and have, for the greater part of a century, been directed to the promotion of the science and practice of agriculture in all its branches.

In accordance with this more enlarged sphere of action, the original title of the Society was altered, under a Royal Charter, in 1834, to The Highland and Agricultural Society of Scotland.

The leading purposes of the Institution are set forth in the following pages, where it will be found that Premiums are awarded for Reports on almost every subject connected with the cultivation of the soil; the rearing and feeding of stock; the management of the dairy; the growth of timber; the extension of cottage accommodation; the improvement of agricultural machinery and implements; the application of chemical science; and the dissemination of veterinary information.

Among the more important measures which have been effected by the Society are—

1. Agricultural Meetings and General Shows of Stock, Implements, &c., held in the principal Towns of Scotland, at which Exhibitors from all parts of the United Kingdom are allowed to compete.

2. A system of District Shows, instituted for the purposes of improving the breeds of Stock most suitable for different parts of the country, and of aiding and directing the efforts of Local Agricultural Associations.

3. The promotion of Agricultural Education, under powers conferred by a Supplementary Royal Charter granted in 1856, and authorising "The Council of the Highland and Agricultural Society on Education" to grant Diplomas to Students of Agriculture (see p. 275).

4. The advancement of the Veterinary Art, by conferring Diplomas on Students who have passed through a prescribed curriculum, and who are found, by public examination, qualified to practise.

5. The appointment of a Chemist, for the purpose of promoting the application of science to agriculture. Investigations on subjects of importance are conducted in the Laboratory, and published in the Transactions. Members can obtain analyses, reports, and advice, on terms below those charged to others (see p. 277).

6. The periodical publication of the Transactions, which comprehend the proceedings in the Laboratory, reports of experiments, and other communications invited and approved by the Society.

CONSTITUTION AND MANAGEMENT.

The general business of THE HIGHLAND AND AGRICULTURAL SOCIETY is conducted under the sanction and control of a Royal Charter, which authorises the enactment of Bye-Laws. Business connected with Agricultural Education is conducted under the authority of a Supplementary Royal Charter, also authorising the enactment of Bye-Laws.

The Office-Bearers consist of a President, Four Vice-Presidents, Ten Extraordinary, and Thirty Ordinary Directors, a Treasurer, an Honorary and an Acting Secretary, an Auditor, and other Officers. The proceedings of the Directors are reported to General Meetings of the Society, held in January, and in June or July. The Council on Education, under the Supplementary Charter, consists of Sixteen Members—Nine nominated by the Charter, and Seven elected by the Society. The Board of Examiners consists of Eleven Members.

Members are elected at the half-yearly General Meetings. The ordinary subscription is £1 3s. 6d. annually, which may be redeemed by one payment, varying, according to the number of previous annual payments, from £12 12s. to £7 1s. Tenant-Farmers, Secretaries and Treasurers of local Agricultural Associations, resident Agricultural Factors, and Proprietors farming the whole of their own lands whose valuation does not exceed £500, are admitted on a subscription of 10s. annually, or £5 5s. for life.

Members of the Society receive the Transactions, and are entitled to apply for District Premiums—to report Ploughing Matches for the Medal—to attend Shows and exhibit Stock free of charge—to consult the Chemist at reduced rates.

Orders, payable at the Royal Bank of Scotland, are issued by the Directors, in name of the parties in whose favour Premiums have been awarded.

All communications must be addressed to "ALEXANDER MACDUFF, Esq., Secretary of the Highland and Agricultural Society of Scotland, 3 George IV. Bridge, Edinburgh."

ESTABLISHMENT FOR 1866.

President.

HIS GRACE THE DUKE OF BUCCLEUCH AND QUEENSBERRY, K.G.

Vice-Presidents.

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THE EARL OF SEAFIELD.
THE EARL OF GLASGOW.
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Extraordinary Directors.

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John Watherston & Sons, *Inspectors of Works.*

Chairmen of Standing Committees.

Argyll Naval Fund,	Admiral Sir Wm. J. Hope Johnstone, K.C.B.
Chemistry, . .	Professor Anderson.
Cottages, . .	Harry Maxwell Inglis of Logan Bank.
District Shows, .	A. Campbell Swinton, yr. of Kimmerghame.
Finance, . .	Anthony Murray of Dollerie.
General Shows .	Alex. Kinloch, yr. of Gilmerton.
House and Buildings,	John Ord Mackenzie of Dolphinton.
Machinery, . .	John Gibson, Woolmet.
Premiums, . .	Professor Lyon Playfair, C.B.
Publications, .	Alexander Forbes Irvine of Drum.
Veterinary College,	Professor Goodsir.

Council on Education.

By a Supplementary Charter under the Great Seal, granted in 1856, the Society is empowered to prescribe a Curriculum for Agricultural Education, and to grant Diplomas.

Members of Council named by Charter.

The Duke of Buccleuch, *Pres.*
The Lord Advocate.
The Dean of Faculty.
The Professor of Agriculture.
The Professor of Anatomy.
The Lord Justice-General, *Vice-Pres.*
The Professor of Botany.
The Professor of Chemistry.
The Professor of Natural History.

Members of Council named by Society.

Sir George Clerk, Bart.
Sir W. Gibson-Craig, Bart.
Sir Alexander C. Gibson-Maitland, Bart.
George Hope, Fenton Barns.
Robert Russell, Pilmuir.
Henry Stephens, Redbrae Cottage.
John Wilson, Edington Mains.

Board of Examiners.

Science and Practice of Agriculture—Mechanics and Construction—Professor Wilson; George Hope, Fenton Barns; Robert Russell, Pilmuir; and John Wilson, Edington Mains.
Botany—Professor Balfour.
Chemistry—Professor Anderson.
Natural History—Professor Allman.
Veterinary Surgery—Professor Dick.
Field Engineering and Surveying—Professor Macquorn Rankine; David Stevenson, C.E.
Book-Keeping and Accounts—Kenneth Mackenzie, C.A., and Archibald Paterson, Meadowfield.

Office.

No. 3, GEORGE IV. BRIDGE.

PREMIUMS.

GENERAL REGULATIONS FOR COMPETITORS.

All Reports must be legibly written, and on one side of the paper only; they must specify the number and subject of the Premium for which they are in competition; they must bear a distinguishing motto, and be accompanied by a sealed letter similarly marked, containing the name and address of the Reporter; initials must not be used.

No sealed letters, unless belonging to a report found entitled to one-half of the Premium offered, will be opened without the author's consent.

Reports, for which a Premium, or one-half of it, has been awarded, become the property of the Society, and cannot be published, in whole or in part, nor circulated in any manner, without the consent of the Directors. All other papers will be returned to the author, if applied for within twelve months.

When a Report is unsatisfactory, the Society is not bound to award the whole or any part of a premium.

All Reports must be of a practical character, containing the results of the writer's own observation or experiment, and the special conditions attached to each premium must be strictly fulfilled. General essays, and papers compiled from books, will not be rewarded. Weights and measurements must be indicated by the imperial standards.

The decisions of the Board of Directors are final and conclusive as to all premiums, whether for Reports or at general or district shows, and it shall not be competent to raise any question or appeal touching such decisions before any other tribunal.

Reports on subjects not included in the premium list will be received, and honorary rewards will be given when merited.

CLASS I.

REPORTS.

SECTION 1.—ON SUBJECTS CONNECTED WITH THE SCIENCE AND PRACTICE OF AGRICULTURE.

Note.—The Directors have resolved to obtain reports of a certain class of experiments, by conducting them in localities, and through parties, specially selected for the purpose. The following subjects, which appeared in the premium book for 1865, have consequently been withdrawn, *without prejudice however to any experiments which may have already been instituted, and which are in progress, it being still competent to lodge reports of these for the premiums formerly offered.*

SUBJECTS WITHDRAWN.

1. Effect of special manures over a rotation.
2. Phosphatic and ammoniacal manures.
3. Mineral and animal phosphates.
4. Large and small plot experiments.
5. Top-dressings for cereals.

1. DIETARIES OF SCOTCH AGRICULTURAL LABOURERS.

For an approved Report on the Dietaries of Scotch Agricultural Labourers, stating, in selected instances over different districts of the country, the actual weight of each kind of food consumed in a week by the labourer and his family, with suggestions for improvement in the dietaries and mode of cooking —Twenty Sovereigns.

Reports to be lodged by 1st November, 1866.

2. AGRICULTURE OF ABERDEENSHIRE AND BANFFSHIRE.

For an approved Report on the Agriculture of Aberdeenshire and Banffshire—Thirty Sovereigns.

The Report should embrace full details of the different systems of Farm Management observed in the district, and of the progress which Agriculture has made within the last 25 years.

Reports to be lodged by 1st November, 1866.

3. AGRICULTURE OF DUMFRIESSHIRE.

For an approved Report on the Agriculture of Dumfriesshire —Thirty Sovereigns.

The Report should embrace full details of the different systems of Farm Management observed in the district, and of the progress which Agriculture has made within the last 25 years.

Reports to be lodged by 1st November, 1867.

4. MANURES PRODUCED BY DIFFERENT KINDS OF FEEDING.

For an approved Report of the result of experiments for ascertaining the comparative value of farm-yard Manure, obtained from cattle fed upon different varieties of food, by the application of such manures to farm crops—Twenty Sovereigns.

The Report must state the effects produced on two successive crops by the application of manure obtained from cattle fed on different sorts of food, such as turnips and straw alone; and turnips and straw, with an addition of oil-cake, linseed, bean-meal, grain, or other substances. The animals should be as nearly as possible of the same age, weight, condition, and maturity, and each lot should receive daily the same quantity of litter; and, except as to the difference of food, they must be treated alike.

The preparation of the manure, by fermentation or otherwise, should be in every respect the same; and it is desirable that not less than two several experiments be made with each kind, and that the ground to which it is to be applied be as equal as possible in quality and condition.

Reports to be lodged by 1st May in any year.

5. MANURE MADE WITH AND WITHOUT COVER.

For an approved Report on the comparative value of Manure made in the ordinary manner, and of Manure kept under cover till applied to the land—Twenty Sovereigns.

The experiment may be conducted either with manure made in the open strawyard, contrasted with that made in covered hammels or boxes, or with manure made in feeding-houses, part of which shall have been placed under cover, and part removed to the open dung-pit, and kept carefully unmixed with any other manure. Preference will be given to experiments embracing both of these modes. The cattle must be fed and littered alike. There must be at least an acre of land experimented on with each sort of manure—the different lots must be manured to the same extent, and be equal in soil, and the crops must be accurately weighed and measured on two separate portions of each lot, not less than 20 poles. The result, as given by two successive crops, to be reported.

Reports to be lodged by 1st May in any year.

6. AUTUMN MANURING.

For an approved Report on the comparative advantages of applying Manure to the stubble in Autumn, or in the drills in Spring, for Turnips, Potatoes, or Beans—Twenty Sovereigns.

The experiment must extend over two years, and comprise a green crop and a grain crop. It must be conducted on not less than four acres—one-half of which shall be dunged in autumn, and the other in spring, with manure made as nearly as possible in the same way, and of equal quantity and quality. The treatment and condition of the land prior to the experiment must be mentioned.

As the object of this premium is to determine the comparative advantages of autumn manuring, there will be no restriction as to labouring the land, but the reporter must state how that was done *on each lot during the experiment*, which, if possible, should be repeated in duplicate.

Reports to be lodged by 1st May, 1867.

7. IMPROVED VARIETIES OF AGRICULTURAL PLANTS.

For an approved Report on the means successfully employed for obtaining new and superior varieties, or improved sub-varieties of any of the cereal grains, grasses, roots, or other agricultural plants—The Gold Medal, or Ten Sovereigns.

It is necessary that the varieties and sub-varieties reported upon shall have been proved capable of reproduction from seed, and also that the relation they bear to others, or well-known sorts, should be stated. The reporter is further requested to mention the effects that he may have observed produced by different soils, manures, &c., on the plants forming the subjects of reports, and how far he may have ascertained such effects to be lasting.

Should any improved variety reported upon be the result of direct experiment by cross impregnation, involving expense and long-continued attention, a higher premium will be awarded.

Reports to be lodged by 1st November, 1866.

8. COMPARATIVE PRODUCTIVENESS, &C., OF POTATOES.

For an approved Report on the comparative productiveness and general qualities for use and keeping, of different kinds of Potatoes used in field culture—The Gold Medal, or Ten Sovereigns.

Reports to be lodged by 1st November, 1867.

9. COMPARATIVE PRODUCTIVENESS, &C., OF TURNIPS.

For an approved Report of the comparative productiveness and general qualities for use and keeping of the different kinds of Swedish, Yellow, and White Turnips, generally used in field culture—The Gold Medal, or Ten Sovereigns.

Reports to be lodged by 1st May, 1867.

10. TURNIP SEED.

For an approved Report on the best mode of Cultivating Turnips, with a view to saving seed—The Gold Medal.

Reports to be lodged by 1st November, 1866.

11. CABBAGE.

For an approved Report on the cultivation of the Cabbage as a field crop—The Gold Medal, or Ten Sovereigns.

The experiment must be conducted on not less than one acre, and contrasted with a like extent under turnips in the same field. Both lots must have been under one rotation, and must be prepared and manured in the same manner.

Reports to be lodged by 1st May, 1867.

12. VEGETABLE PRODUCTIONS OF INDIA, CHINA, AMERICA, &C.

For an approved Report on the hardy and useful herbaceous plants, including Grains and Grasses of China, Japan, the Islands of the Eastern Archipelago, the Himalaya country, the Falkland and South Sea Islands, California, the high north-western districts of America, or any other country where such climate exists as to induce the belief that the plants may be beneficially introduced into the cultivation of Scotland—The Gold Medal, or Ten Sovereigns.

Reporters are required to give the generic and specific names of the plants treated of, with the authority for the same—together with the native names, in so far as known; and to state the elevation of the locality and nature of the soil in which they are cultivated, or which they naturally inhabit, with their qualities or uses; and it is further requested that the descriptions be accompanied, in so far as possible, with specimens of the plants, and their fruit, seed, or other products.

Reports to be lodged by 1st November in any year.

FEEDING STOCK.

The experiments specified in Nos. 13 and 14, must be conducted over a period of not less than three months. No lot shall consist of fewer than four Cattle or ten Sheep. The animals selected should be of the same age, sex, and breed, and, as nearly as possible, of the same weight, condition, and maturity. The live weight before and after the experiment must be stated, and, if killed, their dead weight and quantity of tallow.

13. BEST MODES OF HOUSING FATTENING CATTLE.

For an approved Report on the comparative advantages of fattening Cattle in stalls, in loose houses or boxes, and in sheds or hammels—Twenty Sovereigns.

The Report must detail the comparative result of actual experiments. The same quantities and kinds of food shall be used. Information is required as to the comparative expense of attendance, the cost of erecting the buildings, and any other circumstances deserving of attention. The state of the weather during the experiment, in point of temperature and wetness, must be particularly noted and reported.

Reports to be lodged by 1st May in any year.

14. DIFFERENT DESCRIPTIONS OF FOOD.

For an approved Report of experiments for ascertaining the actual addition of weight to growing or fattening stock, by the use of different kinds of food—Twenty Sovereigns.

The attention of the experimenter is directed to turnips, carrots, beet, mangold-wurzel, potatoes, cabbage, as well as to beans, oats, barley, Indian corn, linseed, oil-cake, or rape-cake, and to the effect of warmth and proper ventilation, and the difference between food cooked and raw. The above roots and other kinds of food are merely suggested; competitors are neither restricted to them, nor obliged to experiment on all of them.

When experiments are made with linseed and cake, attention should be paid to the comparative advantages, economically and otherwise, of the substances in these two states.

Before commencing the comparative experiments, the animals must be fed alike for some time previously.

The progress of different breeds may be compared; this will form an interesting experiment of itself, for reports of which encouragement will be given.

Reports to be lodged by 1st May in any year.

15. SANITARY ARRANGEMENTS FOR STOCK.

For an approved Report on the best construction and arrangement of Byres, Sheds, and Courts for Cattle, with a view to sanitary requirements—The Gold Medal, or Ten Sovereigns.

The Report must have reference to all descriptions of stock, whether breeding, feeding, dairy, or young cattle.

Reports to be lodged by 1st November, 1866.

16. TRANSIT OF STOCK.

For an approved Report on the conditions which should regulate the Carriage of Stock by railway, or by sea, as well as its transit by road—Twenty Sovereigns.

The Reporter will refer to the various modes by which stock is usually forwarded; to the disadvantages attaching thereto, and the evils resulting therefrom; and to the manner in which these should be obviated.

Reports to be lodged by 1st November, 1866.

17. RURAL ECONOMY ABROAD.

For an approved Report, founded on personal observation, of any useful practice, in rural economy, adopted in other countries, and susceptible of being introduced with advantage into Scotland—The Gold Medal.

The purpose chiefly contemplated by the offer of this premium, is to induce travellers to notice and record such particular practices as may seem calculated to benefit Scotland.

Reports to be lodged by 1st November in any year.

SECTION 2—WOODS AND PLANTATIONS.

1. EXTENSIVE PLANTING.

For an approved Report by a Proprietor who shall, within the five preceding years, have planted not less than 150 acres. The whole planting operations that may have been conducted by the Reporter within the five years, whether completed or not, must be embraced, and he must state the expense—description of soil—age, kind, and number of trees planted per acre—mode of planting, draining, and fencing—general state of the plantation—and any other observations of interest—The Gold Medal.

Reports to be lodged by 1st November in any year.

2. FORMATION AND MANAGEMENT OF YOUNG PLANTATIONS.

For an approved Report of Plantations formed within a period of not more than ten, nor less than five years preceding the date of the Report—The Gold Medal, or Ten Sovereigns.

The Report should comprehend every interesting particular; among others, the exposure, altitude, and general climate of the locality—the character and condition of the soil and subsoil—a detailed statement of the expense, including that of enclosing, draining, and fencing, and a specification of the manner in which these operations were performed—the mode of planting adopted—the prevailing weather while planting, and for a month after the operation—the kind of trees planted, and the number of each kind per acre—their relative progress—the proportion of blanks and deaths at the end of three years—the system of management—the state of the plantations at the date of making the report—and any other observations of interest.

Reports to be lodged by 1st November in any year.

3. GENERAL MANAGEMENT OF PLANTATIONS.

For an approved Report of the management of Plantations, from the commencement of the first thinning till the period of yielding full-grown timber—The Gold Medal, or Ten Sovereigns.

The Report must embrace the following points:—The progress of the different sort of trees—the effects of altitude and exposure—the general advantages of shelter—the mode of thinning and pruning adopted—the uses and value of the thinnings—the plan of registry and of valuing, or a specimen of the method in which the forester's book is kept—the valuation at the time of the report—together with such general remarks as may be thought useful.

The Report is not expected to embrace the formation and early management, farther than the description of soil, kinds of plants, whether mixed or in masses, together with a note of the expense from the time of planting to the commencement of the first thinning, in so far as such information is in the possession of the Reporter.

Reports to be lodged by 1st November in any year.

4. PLANTING ON EXPOSED OR ON BARREN TRACTS.

For an approved Report on successful planting within the influence of the sea, or on exposed sterile tracts, founded on observation of the habits and appearance of the different sort of trees considered best suited for such situations—The Gold Medal, or Ten Sovereigns.

The plantations reported on must not be less than ten years old.

Information is particularly desired regarding the species and varieties of trees calculated for growing in situations unfavourable to most of those generally cultivated, as bleak heaths, sandy links, unsheltered maritime situations, and high northern exposures.

The Reporter must specify the extent of planting and mode of drainage and fencing—the nature of the soil and subsoil—the elevation and exposure of the locality—its distance from the sea; and, if in his power, he should notice the geological features of the district.

Reports to be lodged by 1st November in any year.

5. CORSICAN FIR.

For an approved Report on the value, for economical purposes, of the Corsican Fir, and on its adaptation to different soils and situations—The Medium Gold Medal, or Five Sovereigns.

The Reporter's observations must go beyond the limited knowledge of this tree as hitherto grown in Britain, and must embrace its nature, uses, and adaptations in those countries of which it is a native.

Reports to be lodged by 1st November in any year.

6. POPLAR.

For an approved Report on the varieties of Poplar best suited to the climate of Scotland—The Medium Gold Medal, or Five Sovereigns.

In consequence of the failure of the larch, poplar is coming into more general use, and the demand for nursery plants has greatly advanced.

Information is desired as to the varieties of Poplar best suited for different soils and exposures, and also as to its durability, fitness for different industrial purposes, and the quantity of available timber which each variety should yield over a given number of years.

The mode of treatment in respect to preparation of the soil, planting, drainage, shelter, thinning, &c., should be stated.

Reports to be lodged by 1st November, 1866.

7. AMERICAN AND CANADIAN TREES.

For an approved Report on the American and Canadian forest trees adapted for cultivation in Great Britain—The Medium Gold Medal, or Five Sovereigns.

The Reporter will enumerate and describe the varieties which have been, or which may be, usefully introduced from North America—the soils, situations, and conditions most suitable for them—their economic uses and qualities, and the success which may have attended the cultivation of any of them in Great Britain.

Reports to be lodged by 1st November, 1866.

8. FOREST TREES OF RECENT INTRODUCTION.

For an approved Report on the more extended introduction of hardy, useful, or ornamental trees, which have not hitherto been generally cultivated in Scotland—The Medium Gold Medal, or Five Sovereigns.

The report should specify as distinctly as possible the kind of trees introduced. The adaptation of the trees for use or ornament, and their comparative progress, should be mentioned. Attention is directed to the introduction of any tree as a nurse in young plantations, which, by growing rapidly for several years, and attaining maturity when at the height of 20 or 25 feet, might realise the advantages and avoid the evils of thick planting.

Reports to be lodged by 1st November in any year.

9. ROOTS OF CONIFERÆ.

For an approved Report of experiments on the uses to which the fibrous parts of the roots of Coniferous trees may be applied—The Medium Gold Medal, or Five Sovereigns.

In North-west America, the fibrous parts of the roots of some Coniferous trees are extensively employed for purposes similar to those to which willows are applied in this country, more particularly when the wood has been grown on soft, peaty soils. The object of the premium is to elicit information regarding the possibility of profitably extracting and economically applying the vast quantities of roots left in the ground.

Reports to be lodged by 1st November in any year.

10. LARCH FORESTS.

For an approved Report on the formation, progress, present condition, and prospects of extensive Larch Forests in Scotland—The Gold Medal, or Ten Sovereigns.

Reports to be lodged by 1st November, 1866.

SECTION 3.—LAND IMPROVEMENTS.

1. GENERAL IMPROVEMENT OF ESTATES.

To the Proprietor who shall report the most judicious, successful, and extensive improvement—The Gold Medal, or Ten Sovereigns.

The merits of the Report will not be determined so much by the mere extent of the improvements, as by their character and relation to the size of the property. The improvements may comprise reclaiming, draining, enclosing, planting, road-making, building, and all other operations proper to landed estates. The period within which the operations may have been conducted is not limited, except that it must not exceed the term of the reporter's proprietorship.

Reports to be lodged by 1st May in any year.

2. RECLAMATION OF WASTE LAND BY TILLAGE.

1. For an approved Report by a Proprietor or Tenant of having reclaimed within the six preceding years not less than fifty acres of waste land—The Gold Medal, or Ten Sovereigns.

2. For an approved Report by a Tenant of having reclaimed within the four preceding years not less than twenty acres of waste land—The Medium Gold Medal, or Five Sovereigns.

3. For a similar Report by a Tenant of having reclaimed not less than ten acres—The Silver Medal.

The Reports may comprehend such general observations on the improvement of waste lands as the writer's experience may lead him to make, but must refer especially to the lands reclaimed—to the nature of the soil—the previous state and probable value of the subject—the obstacles opposed to its improvement—the details of the various operations—the mode of cultivation adopted—and the produce and value of the crops produced. As the required extent cannot be made up of different patches of land, the improvement must have relation to one subject; it must be of a profitable character, and a rotation of crops must have been concluded before the date of the report. *A detailed statement of the expenditure and return*, and a certified measurement of the ground, are requisite.

Reports to be lodged by 1st May in any year.

3. IMPROVEMENT OF NATURAL PASTURE WITHOUT TILLAGE.

1. For an approved Report of an improvement of the pasturage of not less than thirty acres, by means of top-dressing, draining, or otherwise without tillage, in situations where tillage may be inexpedient—The Gold Medal or Ten Sovereigns.

2. For an approved Report of a similar improvement of not less than ten acres—The Silver Medal.

Reports must state the particular mode of management adopted, the substances applied, the elevation and nature of the soil, its previous natural products, and the changes produced.

Reports to be lodged by 1st May in any year.

SECTION 4.—AGRICULTURAL MACHINERY.

INVENTION OR IMPROVEMENT OF IMPLEMENTS OF HUSBANDRY.

For approved Reports of such inventions or improvements, by the Reporters, of any agricultural implement or machine as shall be deemed by the Society of public utility—Medals, or sums of money not exceeding Fifty Sovereigns.

Reports may be lodged with the Secretary at any time, and should be accompanied by drawings and descriptions of the implement or machine, and, if necessary, by a model.

NOTICE.

DISTRICT COMPETITIONS.

SINCE the following arrangements were printed, the Society has resolved, on account of the Cattle Plague, to withdraw, for this year, all Money Premiums and Medals offered in connexion with local Shows. The various districts will be entitled to a renewal of their respective grants in 1867

CLASS II.

DISTRICT COMPETITIONS.

The Money Premiums awarded at District Competitions will be paid on 1st January next, by precepts issued by the Directors. No payments must therefore be made by the Secretary or Treasurer of any local Association.

(*Grants in aid of* District Competitions *for* 1867 *must be applied for before* 1*st* November *next.*)

Section I. CATTLE.

1. *The Islands of Shetland.*
2. *The District of Annandale.*
3. *The Island of Skye.*
4. *The County of Elgin.*
5. *The County of Nairn.*
6. *The County of Banff and District of Turriff.*
7. *The County of Kincardine.*
8. *The District of Formartine.*
9. *The District of the Perth, Fife, Kinross, and Clackmannan Association.*
10. *The District of Strontian.*
11. *The District of Kintyre.*

Conveners of Committees.

First District—John Bruce of Sumburgh.
Second District—Sir William Jardine, Bart.
Third District—Alexander K. Mackinnon of Corry.
Fourth District—Sir A. P. Gordon Cumming, Bart.
Fifth District—W. A. Stables, Cawdor Castle.
Sixth District—Alexander Morison of Bognie.
Seventh District—Sir Thomas Gladstone, Bart.
Eighth District—John Ramsay of Barra.
Ninth District—The Earl of Rosslyn.
Tenth District—Sir Thomas Miles Riddell, Bart.
Eleventh District—John Lorn Stewart of Coll.

PREMIUMS.

1.	For the best Bull, of any pure breed, not exceeding eight years old, belonging to a Proprietor—The Silver Medal.	
2.	For the best Bull, of any pure breed, calved before 1st January, 1864, and not exceeding eight years old,	£7
3.	For the second best,	£4
4.	For the best Bull, of any pure breed, calved after 1st January, 1864,	£6
5.	For the best two-year-old Heifer (if Highland breed, three years), of any pure breed,	£5
6.	For the second best,	£3

Proprietors farming the whole of their own lands may compete for the Money Premiums.

Note.—The Society's Premiums are granted to each *district for three* alternate years, on condition that the district shall, in the two intermediate years, continue the *Competitions* by *offering for the* same description of stock a sum not less than one-half of that given by the Society.

At the intermediate Competitions, a Silver Medal will be placed at the disposal of the Committee, to be awarded to the best lot exhibited.

In 1866,

Nos. 1, 2, 3, 4, 5, and 6 are in competition for the second year.
No. 7 for the first year.
Nos. 8 and 9 compete for local premiums.
Nos. 10 and 11 are in abeyance on account of the General Show at Glasgow.

RULES OF COMPETITION.

1. The Members of the Society connected with the respective Districts are appointed *Committees for arranging the Competitions*; five members to be a quorum.

2. The Convener of each *district shall summon a meeting of Committee* for the purpose of determining the time and place of Competition, the nomination of Judges, and other preliminary arrangements. The *time* and place (which must be within the bounds of the district) shall be publicly intimated by Conveners.

3. The Competitions must take place between the 1st of April and the 10th of October, and are open to all parties within the district, whether members of the local Association or not. The animals exhibited must belong to one of the following pure breeds:—Shorthorn, Ayrshire, Polled (Galloway, Angus, or Aberdeen), Highland. The Bulls may be of one breed, and the Heifers of another. The Committee shall select the breed, and specify it in the returns.

4. Stock of an inferior description, or which does not fall within the prescribed regulations, shall not be placed for competition. The Premiums shall not be divided. *No Money Premium shall be adjudged unless*

there are three lots exhibited, and not more than one-half unless there are six. A competitor may exhibit two lots in each class. For the Medal, two lots are required.

5. An animal which has gained the Society's first Premium at a previous district or General Show is inadmissible in the same class, except for the Medal; and one which has gained a second Money Premium can only thereafter compete in that class for the first.

6. A Tenant or Factor may compete with Proprietors for the Medal with a Bull which has gained the first Money Premium at a previous Show. When there is any doubt as to whether a competitor should be ranked as a Proprietor or a Tenant, the point is left to the decision of the local Committee.

7. A Bull, the property of two or more Tenants, may compete, although the Exhibitors may not be joint-tenants.

8. Stock must be the property of the Exhibitor at the date of entry, *and no entry shall be received later than one week previous to the Show.* Entry-money shall not exceed 2½ per cent. on the amount of the Premium to be competed for.

9. Bulls for which the Money Premiums are awarded may be required to serve in the district at least one season; the rate of service to be fixed by the Committee.

10. Should it be proved to the satisfaction of the Committee that an animal has been entered under a false name, pedigree, or description, for the purpose of misleading the Committee or Judges as to its qualifications or properties, the case shall be reported to the Directors, and submitted by them to the first General Meeting, in order that the Exhibitor shall be disqualified from again competing at the Society's Shows, and his name, if he be a member, struck from the roll.

11. When an animal has previously been disqualified by the decision of any Agricultural Association in Great Britain or Ireland, such disqualification shall attach, if the Exhibitor, being aware of the disqualification, fail to state it, and the grounds thereof, in his entry, to enable the Committee to judge of its validity.

12. Blank reports will be furnished to the Conveners of the different districts. These must, in all details, be completed and lodged with the Secretary on or before the 1st of November next, for the approval of the Directors, against whose decisions there shall be no appeal.

13. A report of the Competition and Premiums awarded at the *intermediate* local shows, in the several districts, signed by a Member of the Society, must be transmitted to the Secretary on or before the 1st November in each year, otherwise the Society's grant shall terminate.

14. It is to be distinctly understood that in no instance does any claim lie against the Society for expenses attending a show of stock beyond the amount of the Premiums offered.

SECTION 2. DRAUGHT HORSES

1. *The District of Wester Ross.*
2. *The District of the Perth, Fife, Kinross, and Clackmannan Association.*

Conveners of Committees.

FIRST DISTRICT—Keith W. Stewart Mackenzie of Seaforth.
SECOND DISTRICT—Sir G. Graham Montgomery, Bart., M.P.

PREMIUMS.

1. For the best Stallion, for agricultural purposes, not under three years and nine months, and not above twelve years old, ...	£25
2. For the best Brood Mare, for agricultural purposes, .	10
3. For the best Filly, foaled after 1st January 1864, .	5

These premiums are granted for two years, £30 being contributed by the Society, and £10 by the District.

In 1866,

Nos. 1 and 2 are in competition for the second year.

RULES OF COMPETITION.

1. The Members of the Society in the several Districts are appointed Committees of Superintendence. They shall be convened in the manner and for the purposes prescribed by Nos. 1 and 2 of the Regulations for Cattle Competitions.

2. The Competition for Stallions, and that for Mares and Fillies, may be held at different periods, but both must take place within the districts named, unless, in reference to Stallions, special permission has been obtained to the contrary.

3. If fewer than three animals be exhibited in any class, half the Premium only can be awarded. The Regulations for Cattle Shows, regarding intimation—entry of stock—its exclusion, if of inferior quality—false entries—extra expenses—and the manner in which the Reports are to be certified and transmitted to the Society—are severally applicable to the Premiums for Horses. Evidence must be produced that the Prize Stallions have had produce. Mares must have foals at their feet, or be entered as being in foal; in the latter case payment of the Premiums will be deferred till certificate of birth.

ENTIRE COLTS.

1. *The County of Linlithgow.*
2. *The County of Edinburgh.*
3. *The County of Lanark.*

Conveners of Committees.

First District—R. H. Johnston Stewart of Straiton.
Second District—Sir James Gardiner Baird, Bart.
Third District—J. G. C. Hamilton of Dalzell.

PREMIUMS.

1. For the best Entire Colt, for agricultural purposes, foaled after 1st January 1864, ...	£6
2. For the best Entire Colt, for agricultural purposes, foaled after 1st January 1865, . .	£4

Four lots in each Class will warrant the award of full, and two lots of half, premiums. The other regulations for Horses are generally applicable. These premiums are granted for two years.

In 1866,

Nos. 1 and 2 are in competition for the last year.
No. 3 is in abeyance on account of the General Show at Glasgow.

SECTION 3. SHEEP.

The Premiums for sheep are granted for three alternate years, under the same conditions as those for Cattle. See Note, p. 242.

A Silver Medal, as in the case of Cattle, is allowed for the intermediate years.

1. LEICESTER BREED.

1. *The County of Forfar.*
2. *The District of the Border Union Society.*
3. *The County of Edinburgh.*
4. *The Stewartry of Kirkcudbright.*

Conveners of Committees.

FIRST DISTRICT—Sir John Ogilvy, Bart., M.P.
SECOND DISTRICT—Sir George H. Scott Douglas, Bart.
THIRD DISTRICT—Sir James Gardiner Baird, Bart.
FOURTH DISTRICT—Wellwood H. Maxwell of Munches.

1. For the best Tup, belonging to a Proprietor—The Silver Medal.

2. For the best Tup of any age, ...	£5
3. For the best Shearling Tup, ...	£5
4. For the best Pen of five Ewes, not more than four Shear,	£5
5. For the best Pen of five Gimmers or Shearling Ewes,	£4

Proprietors farming the whole of their own lands may compete for the Money Premiums.

In 1866,

Nos. 1 and 2 are in competition for the second year.
No. 3 for the first year.
No. 4 competes for local Premiums.

2. CHEVIOT BREED.

1. *The District of West Teviotdale.*
2. *The County of Peebles.*
3. *The Pastoral District of Ross-shire.*
4. *The County of Sutherland.*
5. *The District of Mull, Coll, and Tyree.*

Conveners of Committees.

First District—Allan Eliott Lockhart of Borthwickbrae.
Second District—Sir G. Graham Montgomery, Bart., M.P.
Third District—Sir Kenneth S. Mackenzie of Gairloch, Bart.
Fourth District—The Duke of Sutherland, or in his absence, George Loch.
Fifth District—Farquhar Campbell of Aros.

1. For the best Tup belonging to a Proprietor—The Silver Medal.
2. For the best Tup of any age, ... £5
3. For the best Shearling Tup, ... £5
4. For the best Pen of five Ewes, not more than four Shear, £5
5. For the best Pen of five Gimmers or Shearling Ewes, £4

Proprietors farming the whole of their own lands may compete for the Money Premiums.

In 1866,

Nos. 1 and 2 are in competition for the last year.
Nos. 3 and 4 for the second year.
No. 5 is in abeyance, on account of the General Show at Glasgow.

3. BLACKFACED BREED.

DISTRICTS.

1. *The District of Lochaber.*
2. *The District of Athole and Weem.*
3. *The District of Badenoch.*
4. *The Upper Ward of Lanarkshire.*
5. *The District of Argyle.*
6. *The District of Lorn.*

Conveners of Committees.

First District—Donald Cameron of Lochiel.
Second District—Sir Robert Menzies of Menzies, Bart.
Third District—Cluny Macpherson.
Fourth District—John Ord Mackenzie of Dolphinton.
Fifth District—William Campbell of Ormsary.
Sixth District—Captain MacDougall of MacDougall.

1 For the best Tup belonging to a Proprietor—the Silver Medal.
2 For the best Tup of any age, ... £5
3. For the best Shearling Tup, ... £5
4. Eor the best pen of five Ewes, not more than four shear, £5
5. For the best pen of five Gimmers or Shearling Ewes, £4

Proprietors farming the whole of their own lands may compete for the money premiums.

In 1866,

No. 1 is in competition for the last year.
Nos. 2 and 3 for the first year.
Nos. 4, 5, and 6 are in abeyance, on account of the General Show a Glasgow.

RULES OF COMPETITION.

1. The Members of the Society in the several Districts are appointed Committees as under Nos. 1 and 2 of the Regulations for Cattle Competitions, and they shall be convened by their respective Conveners in the manner and for the purposes specified in these regulations.

2. The Competition is open to all within the district; it shall take place between the 1st of April and the 10th of October, and the time and place must be publicly intimated by each Convener within his District.

3. Aged Tups shall have served the usual number of Ewes for at least three weeks during the previous season. All prize Tups must serve within the District. Ewes must have reared Lambs during the season. Ewes and Gimmers must be taken from regular breeding hirsels.

4. The Premiums shall not be divided. *No money Premiums shall be adjudged unless there are three lots exhibited, and only one-half if there are not six lots.* Each competitor may show two lots. For the medal two lots are required. The other regulations for cattle competitions,—in regard to the date of entry—the amount of entry-money—the placing of stock—the exclusion of animals which have gained premiums at previous shows—the right of a tenant or factor, under certain circumstances, to compete for the medal—reporting false entries—the regulation as to expenses—the manner in which the reports must be certified and transmitted—and the incompetency of appeal against decisions by the Directors,—are applicable to the premiums for Sheep.

5. Blank reports will be furnished to the Conveners of districts. These must be accurately filled up in all details, signed by the Conveners, and transmitted to the Secretary by the 1st of November. Reports of intermediate competitions must be lodged at the same time.

4. SHEARING SHEEP.

The Silver Medal will be given to the best Sheep-shearer in each of the districts in which the premiums for Sheep are in operation.

CONDITIONS.

1. Money premiums must be awarded by the district at each competition to the amount of not less than £2.

2. The district Convener will fix the time and place of competition, and make all necessary arrangements.

3. The medal shall not be awarded unless there are three competitors, and it shall always accompany the highest money premium. If two or more lots appear to be equally well executed, preference should be given to that executed within the shortest time.

4. The Conveners shall report the particulars of the competition and the award of the Judges to the Society, along with the report of the sheep premiums in the district.

SECTION 4—SWINE.

DISTRICTS.

1. *The District of Dalkeith.*
2. *The County of Orkney.*

Conveners of Committees.

FIRST DISTRICT—Sir James Gardiner Baird, Bart.
SECOND DISTRICT—J. G. Heddle of Melsetter.

1. For the best Boar belonging to a Proprietor—the Silver Medal.	
2. For the best Boar, ...	£4
3. For the second best, ...	£2
4. For the best breeding Sow, ...	£3
5. For the second best, ...	£1

Proprietors farming the whole of their own lands may compete for the money premiums.

The above premiums are given to each district for three consecutive years.

In 1866,

No. 1 is in competition for the last year.
No. 2 for the first year.

1. The Regulations for cattle competitions are generally to be held as applicable to the premiums for swine; and the Convener and Committee of the Society's members in the district are accordingly referred to them.

2. Four lots in each class will warrant the award of full, and two lots of half premiums. There must be at least two competitors for the medal.

3. Blank reports will be furnished to the Conveners of districts, These must be accurately filled up in all details, signed by the Conveners, and transmitted to the Secretary by the 1st of November next.

CLASS III.

DAIRY PRODUCE.

DISTRICTS.

1. *The Western District of Midlothian.*
2. *The Lower Ward of Renfrewshire.*

Conveners of Committees.

First District—Peter M'Lagan of Pumpherston, M.P.
Second District—Sir M. R. Shaw Stewart, Bart.

1. BUTTER.

1. For the best sample of Cured Butter (not less than 14 lbs., belonging to a Proprietor—The Silver Medal.
2. For the best sample of Cured Butter (not less than 14 lbs.) £3
3. For the second best, ... £2

2. CHEESE.

4. For the best couple of Sweet Milk Cheeses belonging to a Proprietor—The Silver Medal.
5. For the best Couple of Sweet Milk Cheeses, . £3
6. For the second best, ... £2

Proprietors farming the whole of their own lands may compete for the Money Premiums.

The above Premiums are given to each district for three consecutive years.

In 1866,

No. 1 is in competition for the last year.
No. 2 is in abeyance on account of the Glasgow Show.

CONDITIONS.

1. The Members of the Society resident within the districts are appointed Committees of Superintendence, for the purposes expressed in the Regulations for Cattle Competitions. Each Committee shall fix such general regulations as they may consider proper, and, in particular, the time and place of competition.

2. Eight Exhibitors in any one class will warrant an award of full, and four of half Premiums. There must be at least two Competitors for the Medal.

3. Competitors must certify that the Butter and Cheese exhibited by them are average specimens of the produce of their Dairies in 1866; and that the quantity produced during the season has not been less than 1 cwt. of Butter, or 2 cwt. of Cheese.

4. In the event of two or more competing lots being deemed equal in quality, the Premium shall be awarded to the Competitor who has made the larger quantity.

5. The successful Competitors, before receiving the Premiums, are required to transmit to the Secretary a detailed report of the whole process followed by them in the manufacture of their Butter or Cheese.

6. Reports of the award of the Premiums to be lodged with the Secretary on or before the 1st November next.

MEDALS FOR CHEESE.

Two Medium Gold Medals will be placed at the disposal of the Ayrshire Association to be competed for at Kilmarnock. The one, for the best lot of Cheddar Cheese—the other, for the best lot of Sweet Milk Cheese of any other variety; the Cheeses, in either case, to be made in Scotland.

Convener of Committee.

Colonel Ferrier Hamilton of Cairnhill.

CLASS IV.

CROPS AND CULTURE.

I. SEEDS.

The Society, with a view of aiding local Associations, gives the Silver Medal in the following districts, and for the following Seeds :—

1. County of AYR: Convener, Sir James Fergusson, Bart, M.P.
    1. Any variety of Wheat.
    2. Any variety of Barley.
    3. Any variety of Oats.
    4. Perennial Ryegrass.
2. County of STIRLING: Convener, John Stirling of Kippendavie.
    1. Any variety of Wheat.
    2. Any variety of Barley.
    3. Any variety of Oats.
    4. Any variety of Beans.
    5. Tares.
3. District of WESTER ROSS: Convener, Keith W. Stewart Mackenzie of Seaforth.
    1. Any variety of Wheat.
    2. Any variety of Barley.
    3. Any variety of Oats.
    4. Perennial Ryegrass.
4. District of the BLACK ISLE: Convener, Major Wardlaw, Belmaduthy.
    1. Any variety of Barley.
    2. Any variety of Oats.
5. County of CAITHNESS: Convener, Alexander Henderson of Stemster.
    1. Any variety of Barley.
    2. Any variety of Oats.

6. Islands of SHETLAND: Convener, John Bruce of Sumburgh.
   1. Any variety of Bere.
   2. Any variety of Oats.
   3. Perennial Ryegrass.

7. District of SPEY, AVON, and FIDDOCHSIDE: Convener, Sir George Macpherson Grant, Bart.
   1. Any variety of Barley.
   2. Any variety of Oats.

8. District of STRATHEARN: Convener, Sir John H. Stuart Forbes, Bart.
   1. Any variety of Oats.

CONDITIONS.

1. In each district the Convener shall fix the time and place of Competition, appoint the Judges, and make all other necessary arrangements, in concurrence with the other Members of the Society, and the local Association of the District. Conveners will be furnished with blank Schedules for reporting the awards.

2. The quantity shown in Competition by each Grower must not be less than three quarters of each variety of Grain, or two quarters of Beans or Grass Seeds. There must at least be two Competitors. The first Premium awarded by the district shall not be less than £1 for each kind of Grain for which a Medal is claimed.

3. The Judges shall be guided in their awards, *1st*, By the purity of the Seed; *2d*, By its freeness from extraneous Seeds; and, *3d*, Where there is an equality in these respects, by the Weight.

4. Successful Competitors must transmit, free of expense, two quarts of each kind of Seed, addressed to the Secretary, at the Society's Hall, 3, George IV. Bridge, Edinburgh.

5. The Returns must shew, as accurately as possible, the produce per imperial acre, also the altitude, exposure, and nature of the soil on which the crops were raised, together with the dates of sowing and reaping, and the weight per bushel. The varieties for which premiums have been given must be named. Reports of the several competitions must be lodged by the 1st of November.

6. The Medals will be continued in each District for five consecutive years. Applications from other Districts must be lodged with the Secretary of the Society by 1st November next.

2. PLOUGHING COMPETITIONS.

The Silver Medal will be given to the winner of the first Premium at Ploughing Competitions, where there are fifteen Ploughs, and Premiums to the amount of Three Sovereigns, provided a Report in the following terms is made to the Secretary, within one month of the Competition, by a Member of the Society, and the undernoted conditions have been observed :—

FORM OF REPORT.

I of Member of the Highland and Agricultural Society, hereby certify, that I attended the Ploughing Match of the Association at in the county of on the when ploughs competed; of land was assigned to each, and hours were allowed for the execution of the work. The sum of £ was awarded in the following proportions, viz. :—

[Here enumerate the names and designations of successful Competitors.]

CONDITIONS.

1. All Matches must be at the instance of a local Society or Ploughing Association, and no Match at the instance of an individual, or confined *to the tenants of one estate*, will be recognised.

2. The title of such Society or Association, together with the name and address of the Secretary, must be registered with the Secretary of the Highland and Agricultural Society, 3 George IV. Bridge, Edinburgh.

3. Not more than one Match, in the same season, can take place within the bounds of the same Society or Association.

4. All Reports must be lodged within one month of the date of the Match, and certified by a Member of the Society who was present at it.

5. A Member can *only* report one Match, and a Ploughman can only carry one Medal, in the same season.

6. To warrant the Medal there must have been fifteen Ploughs in Competition, and three Pounds awarded in Premiums.

7. Ploughmen shall not be allowed any assistance, and their work must not be set up nor touched by others; on land of average tenacity the ploughing should be at the rate of an imperial acre in ten hours, and attention should be given to the sufficiency of the work below, as well as to its neatness above the surface.

3. REAPING MACHINES.

The Silver Medal will be given to the Servant found most expert at a trial of Reaping Machines, when not fewer than four were in operation, and Premiums to the amount of Two Sovereigns were awarded. Reports must be lodged with the Secretary not later than the 1st of November, by a Member who has inspected the work.

4. MEDALS IN AID OF PREMIUMS GIVEN BY LOCAL SOCIETIES.

The Society being anxious to co-operate with local Associations, will give a limited number of Silver Medals annually, in addition to the Money Premiums awarded in the district :—

1. STOCK.—To Local Societies not on the list of District Competitions, awarding Premiums for Stock to the amount of £10, and reporting their Shows to the Secretary—The

Silver Medal for the best Male and for the best Female animal of any Pure Breed.

Applied for by the Western District of Mid-Lothian Association—Convener, Peter M'Lagan of Pumpherston, M.P.
Penicuik Society—Convener, the Right Hon. Sir George Clerk, Bart.
Buchan Society—Convener, George Baird of Strichen.
Wester Ross Club—Convener, Keith W. Stewart Mackenzie of Seaforth.
Spey, Avon, and Fiddochside Association—Convener, Sir George Macpherson Grant, Bart.
Dalbeattie Society—Convener, Wellwood H. Maxwell of Munches.
Black Isle Society—Convener, Major Wardlaw, Belmaduthy.
Fettercairn Club—Convener, Lieutenant-Colonel MacInroy of the Burn.
Sanquhar Society—Convener, James Veitch of Eliock.
Leochel-Cushnie Society—Convener, Arthur Forbes Gordon of Rayne.
Caithness Society—Convener, Alexander Henderson of Stemster.
Cluny Association—Convener, John Gordon of Cluny.

2. Wool.—For the best sample of the following wools :—

Laid Cheviot, washed.
Laid Cross, washed.
Laid Blackfaced, unwashed.
Hogg, White Cheviot.
White Long.

Silver Medal for each variety.

Applied for by the Inverness Farmers' Club, and subject to its conditions—Convener, Henry W. White of Monar.

3.—For the best managed Farm—The Silver Medal.

Applied for by the Nairnshire Society—Convener, Wm. Alexander Stables, Cawdor Castle.
Inverness Society—Convener, Arthur Forbes of Culloden.
Kincardineshire Club—Convener, Sir John H. S. Forbes, Bart.
Mauchline Society—Convener, C. V. H. Campbell of Netherplace.
Kilmarnock Club—Convener, Frederick J. Turner, The Dean.
Cluny Association—Convener, John Gordon of Cluny.
Spey, Avon, and Fiddochside Society—Convener, Sir George Macpherson Grant, Bart.

4. For the best managed Dairy—The Silver Medal.

Applied for by the Mauchline Society—Convener, Colonel Ferrier Hamilton.
Kilmarnock Club—Convener, Frederick J. Turner, The Dean.

5. For the best managed Green Crop—The Silver Medal.

Applied for by the Bute Society—Convener, James Muir, Barone Park.

Inverness Society—Convener, *Arthur* Forbes of Culloden.
Carrick Farmers' Society—Convener, Sir James Fergusson of Killeran, Bart., M.P.
Dunblane Club—Convener, John Stirling of Kippendavie.
Leochel-Cushnie Society—Convener, A. Forbes Gordon of Rayne.
Clackmannan Society—Convener, James Johnstone of Alva.
Fettercairn Club—Convener, Lieutenant-Colonel MacInroy of the Burn.
Mauchline Society—Convener, C. V. H. Campbell of Netherplace.
Kincardineshire Club—Convener, Sir John H. S. Forbes, Bart.
Kilmarnock Club—Convener, Frederick J. Turner, The Dean.
Cluny Association—Convener, J. Gordon of Cluny.

6. For the best managed HAY CROP—The Silver Medal.

Applied for by the Clackmannanshire Society—Convener, James Johnstone of Alva.

7. For the best kept FENCES—The Silver Medal.

Applied for by the Kilmarnock Club—Convener, Frederick J. Turner, The Dean.

8. To the most expert HEDGE-CUTTER—The Silver Medal.

Applied for by the Kilmarnock Club—Convener, Frederick J. Turner, The Dean.

9. To the Labourer most expert and efficient in opening, laying, and filling Drains, and otherwise executing the works necessary in thorough Draining—The Silver Medal.

Applied for by the Kilmarnock Club—Convener, Frederick J. Turner, The Dean.

10. For the best SWEET MILK CHEESE—The Silver Medal.

Applied for by the Cumnock Society—Convener, C. V. H. Campbell of Netherplace.
Sanquhar Society—Convener, James Veitch of Eliock.
Stewarton Society—Convener, James Lindsay, Thornhill.
Shetland Society—Convener, John Bruce of Sumburgh.
Ardrossan Farmer's Society—Convener, David Cuninghame, Chapelton.
Nithsdale Society—Convener, Dr Russell, Thornhill.
West Linton Society—Convener, W. Allan Woddrop of Dalmarnock.

11. For the best CURED BUTTER—The Silver Medal.

Applied for by the Cumnock Society—Convener, C. V. H. Campbell of Netherplace.
Sanquhar Society—Convener, James Veitch of Eliock.
Shetland Society—Convener, John Bruce of Sumburgh.
Ardrossan Farmer's Society—Convener, David Cuninghame, Chapelton.
Nithsdale Society—Convener, Dr. Russell, Thornhill.
West Linton Society—Convener, W. Allan Woddrop of Dalmarnock.

12. For the best COLLECTION OF ROOTS—The Silver Medal.

Applied for by the Cumnock Society—Convener, C. V. H. Campbell of Netherplace.
Sanquhar Society—Convener, James Veitch of Eliock.

13. For the best COLLECTION OF SEEDS—The Silver Medal.

Applied for by the Cumnock Society—Convener, C. V. H. Campbell of Netherplace.
Sanquhar Society—Convener, James Veitch of Eliock.
Stewarton Society—Convener, James Lindsay, Thornhill.

The Medals to be issued will be limited to ten in each class, except No. 1.
The Money Premiums given in the District must be £2 in each case, and in No. 1, £10.
Reports of the several Competitions, and applications for Medals in 1867, must be lodged by 1st November next.

CLASS V.

COTTAGES AND GARDENS.

The following Premiums are offered for Competition in the Parishes after-mentioned. The Medals and one-half of the Premiums are given by the Society, and the other half is contributed by the respective Parishes.

COTTAGES.

1. For the best kept Cottage in each Parish—One Pound Five Shillings; and where there are four Competitors—The Silver Medal.
2. For the second best—One Pound.
3. For the third best—Fifteen Shillings.

GARDENS.

1. For the best kept Cottage Gardens in each Parish—One Pound Five Shillings; and where there are four Competitors—The Silver Medal.
2. For the second best—One Pound.
3. For the third best—Fifteen Shillings.

Aberdeenshire.

LEOCHEL-CUSHNIE—Convener, Arthur Forbes Gordon of Rayne.
STRICHEN—Convener, George Baird of Strichen.
BIRSE—Convener, James Dyce Nicol of Ballogie, M.P.

Edinburghshire.

WEST-CALDER—Convener, Robert Steuart of Carfin.

Fifeshire.

MARKINCH—Convener, William Ballingal, Sweetbank.

Lanarkshire.

LESMAHAGOW—Convener, W. E. Hope Vere of Blackwood.
DOUGLAS—Convener, Thomas Rennie Scott, Castle Mains.

Peeblesshire.

BROUGHTON—Convener, James Tweedie of Quarter.

Perthshire.

FORGANDENNY—Convener, .

Wigtownshire.

KIRKCOLM—Convener, David Guthrie, Stranraer.
LESWALT—Convener, Sir Andrew Agnew of Lochnaw, Bart., M.P.
PORT-PATRICK—Convener, Sir Edward Hunter Blair, Bart.
OLD LUCE—Convener, Sir John C. Dalrymple Hay of Park Place, Bart.
STONEYKIRK—Convener, David Frederick, Dumbreddon.

CONDITIONS.

1. Competitions may take place in the different parishes for Cottages and Gardens, or for either separately.

2. The occupiers of Gentlemen's Lodges and Gardeners' Houses, as well as Gentlemen's Servants occupying Cottages in the Policies, or on land in the natural possession of their masters, are excluded. The inspection must be completed by the 1st of October. In making the inspection, the Conveners may take the assistance of any competent judges.

3. The annual value of each Cottage, with the ground occupied in the parish by a Competitor, shall not exceed £5 sterling. A person who has gained the highest Premium cannot compete again, but will be entitled to a Medal if certified by the Committee to be equal in merit to the first on the list of Competitors.

4. If the cottage is occupied by the proprietor, the roof must be in good repair, if the roof is of thatch, it must be in good repair, though in the occupation of a tenant. The interior and external conveniences must be clean and orderly—the windows must be free of broken glass, clean, and affording the means of ventilation. Dunghills, and all other nuisances, must be removed from the front and gables In awarding the Cottage Premiums, preference will be given to Competitors who, in addition to the above requisites, have displayed the greatest taste in ornamenting the exterior of their houses, and the ground in front and at the gables

5. In estimating the claims for the Garden Premiums, the Judges should have in view.—The sufficiency and neatness of the fences and walks; the cleanness of the ground; the quality and choice of the crops; and the general productiveness of the garden.

6. Reports, stating the number of competitors, the names of successful parties, and the nature of the exertions which have been made by them, must be transmitted by the Conveners to the Secretary on or before 1st November next.

Parishes desirous of these Premiums must lodge applications with the Secretary on or before the 1st November next

MEDALS FOR COTTAGES OR GARDENS.

The Society will issue annually twelve Medals to local Associations or individuals, who at their own expense establish Premiums for Cottages or Gardens.

The Medals will be issued upon a Report by a Member of the Society in the terms required by the preceding conditions, describing the merits of the Cottages or Gardens. The Reports to be lodged with the Secretary on or before the 15th October, 1866.

Applied for by

The Parishes of Forglen and Alvah.
The Mauchline Horticultural Society.
The Abernethy Gardening Society.
The Conan and Maryburgh Gardening Society.
The United East Lothian Society.
The Logiealmond and Glenalmond Horticultural Society
Arthur Forbes Gordon of Rayne.
Archdeacon Bisset of Lessendrum.
Sir George Macpherson Grant, Bart.
Cromar Horticultural Association.

IMPROVING EXISTING COTTAGES.

To the Proprietor in Scotland who shall report the Improvement of the greatest number of Cottages in the years 1863, 1864, and 1865—The Gold Medal.

BUILDING NEW COTTAGES.

To the Proprietor in Scotland who shall report the Erection of the greatest number of approved Cottages during the years 1862, 1863, 1864, and 1865—The Gold Medal.

CONDITIONS.

1. Claims for the above Premiums must be lodged with the Secretary on or before the 1st of October next, to allow an inspection to be made of the different Cottages. The inspection will be conducted by a Committee of the Society's Members, and Reports must be transmitted to the Secretary on or before the 1st November.

2. The annual value of the Cottage or Cottages separately, with the garden ground, must not exceed £5.

3. In estimating the claims of the Competitors, the following points will be kept in view:—The external appearance of the Cottages; their internal accommodation; the arrangements of the outhouses; the means of drainage and ventilation; and the expense of the building or of the alteration, compared with its durability and accommodation. When the Cottages of one Competitor are superior in style and comfort to those of another, though not so numerous, the Inspectors will give them the preference, provided they amount at least to three, and have been erected at a moderate expense.

4. Parties competing will forward to the Society Plans, Specifications, and Estimates, of which, and of all information sent therewith, copies may be taken for publication, if the Society shall see fit, and the originals returned to the parties within six months, if desired.

ACCOMMODATION FOR FARM SERVANTS.

To the Proprietor in Scotland who shall have erected on his estate the most approved Farm-buildings in reference to the proper accommodation of Farm-servants—The Gold Medal.

Reports, Plans, and Specifications to be lodged by the 1st November 1866.

GENERAL SHOW OF STOCK & IMPLEMENTS,

AT

GLASGOW,

1867.

HIS GRACE THE DUKE OF BUCCLEUCH AND QUEENSBERRY, K.G.,

President of the Society.

THE RIGHT HON. LORD BELHAVEN, K.T.,

Chairman of the Local Committee.

The District connected with the Show comprises the Counties of LANARK, AYR, ARGYLE, RENFREW, BUTE, and ARRAN.

The Competition is open to Exhibitors from all parts of the United Kingdom.

Members of the Society are exempted from entry-money of 2½ per cent. on premiums for Stock. They are admitted to the Show-Yard at half-price during the judging of Stock. At other periods they have free access.

New Members may be proposed for Election at the General Meeting in June.

PREMIUMS.

NOTE.—*The Medium Gold Medal will be given to any Animal which, having gained the Society's highest Premium at a former Show in the classes of Aged Bulls, Cows, Stallions, or Mares is disqualified from again competing.*

CLASS I.—CATTLE.

AYRSHIRE.

SECTION		
1	Best Bull calved before 1st Jan. 1865,	Twenty Sovereigns.
	Second best, ...	Ten Sovereigns.
	Third best, ...	The Bronze Medal.
	Breeder of best Bull, . . .	The Silver Medal.

Section		
2	Best Bull calved after 1st Jan. 1865,	Twenty Sovereigns.
	Second best,	Ten Sovereigns.
	Third best,	The Bronze Medal.
3	Best Bull calved after 1st Jan. 1866,	Ten Sovereigns.
	Second best,	Five Sovereigns.
	Third best,	The Bronze Medal.
4	Best Cow, in Milk, calved before 1st Jan. 1864,	Twenty Sovereigns.
	Second best,	Ten Sovereigns.
	Third best,	Bronze Medal.
5	Best Cow, in Milk, calved after 1st Jan. 1864,	Fifteen Sovereigns.
	Second best,	Eight Sovereigns.
	Third best,	The Bronze Medal.
6	Best Cow, in Calf, of any age,	Fifteen Sovereigns.
	Second best,	Eight Sovereigns.
	Third best,	The Bronze Medal.
7	Best Heifer calved after 1st Jan. 1865,	Ten Sovereigns.
	Second best,	Five Sovereigns.
	Third best,	The Bronze Medal.
8	Best Heifer calved after 1st Jan. 1866,	Eight Sovereigns.
	Second best,	Four Sovereigns,
	Third best,	The Bronze Medal.

SHORT-HORN.

9	Best Bull calved before 1st Jan. 1865,	Twenty Sovereigns.
	Second best,	Ten Sovereigns.
	Third best,	The Bronze Medal.
	Breeder of best Bull,	The Silver Medal.
10	Best Bull calved after 1st Jan. 1865,	Twenty Sovereigns.
	Second best,	Ten Sovereigns.
	Third best,	The Bronze Medal.
11	Best Bull calved after 1st Jan. 1866,	Ten Sovereigns.
	Second best,	Five Sovereigns.
	Third best,	The Bronze Medal.
12	Best Cow of any age,	Fifteen Sovereigns.
	Second best,	Eight Sovereigns.
	Third best,	The Bronze Medal.
13	Best Heifer calved after 1st Jan. 1865,	Ten Sovereigns.
	Second best,	Five Sovoreigns.
	Third best,	The Bronze Medal.

Section		
14	Best Heifer calved after 1st Jan. 1866,	Eight Sovereigns.
	Second best,	Four Sovereigns.
	Third best,	The Bronze Medal.

POLLED ANGUS OR ABERDEEN.

15	Best Bull calved before 1st Jan. 1865,	Twenty Sovereigns.
	Second best,	Ten Sovereigns.
	Third best,	The Bronze Medal.
	Breeder of best Bull,	The Silver Medal.
16	Best Bull calved after 1st Jan. 1865,	Twenty Sovereigns.
	Second best,	Ten Sovereigns.
	Third best,	The Bronze Medal.
17	Best Bull calved after 1st Jan. 1866,	Ten Sovereigns.
	Second best,	Five Sovereigns.
	Third best,	The Bronze Medal.
18	Best Cow of any age,	Fifteen Sovereigns.
	Second best,	Eight Sovereigns.
	Third best,	The Bronze Medal.
19	Best Heifer calved after 1st Jan. 1865,	Ten Sovereigns.
	Second best,	Five Sovereigns.
	Third best,	The Bronze Medal.
20	Best Heifer calved after 1st Jan. 1866,	Eight Sovereigns.
	Second best,	Four Sovereigns.
	Third best,	The Bronze Medal.

POLLED GALLOWAY.

21	Best Bull calved before 1st Jan. 1865,	Twenty Sovereigns.
	Second best,	Ten Sovereigns.
	Third best,	The Bronze Medal.
	Breeder of best Bull,	The Silver Medal.
22	Best Bull calved after 1st Jan. 1865,	Twenty Sovereigns.
	Second best,	Ten Sovereigns.
	Third best,	The Bronze Medal,
23	Best Bull calved after 1st Jan. 1866,	Ten Sovereigns.
	Second best,	Five Sovereigns.
	Third best,	The Bronze Medal.
24	Best Cow of any age,	Fifteen Sovereigns.
	Second best,	Eight Sovereigns.
	Third best,	The Bronze Medal.
25	Best Heifer calved after 1st Jan. 1865,	Ten Sovereigns.
	Second best,	Five Sovereigns.
	Third best,	The Bronze Medal.

Section		
26	Best Heifer calved after 1st Jan. 1866,	Eight Sovereigns.
	Second best,	Four Sovereigns.
	Third best,	The Bronze Medal.

HIGHLAND.

27	Best Bull calved before 1st Jan. 1864,	Twenty Sovereigns.
	Second best,	Ten Sovereigns.
	Third best,	The Bronze Medal.
	Breeder of best Bull,	The Silver Medal.
28	Best Bull calved after 1st Jan. 1864,	Twenty Sovereigns.
	Second best,	Ten Sovereigns.
	Third best,	The Bronze Medal.
29	Best Bull calved after 1st Jan. 1865,	Ten Sovereigns.
	Second best,	Five Sovereigns.
	Third best,	The Bronze Medal.
30	Best Cow of any age,	Fifteen Sovereigns.
	Second best,	Eight Sovereigns.
	Third best,	The Bronze Medal.
31	Best Heifer calved after 1st Jan. 1864,	Ten Sovereigns.
	Second best,	Five Sovereigns.
	Third best,	The Bronze Medal.
32	Best Heifer calved after 1st Jan. 1865,	Eight Sovereigns.
	Second best,	Four Sovereigns.
	Third best,	The Bronze Medal.

FAT STOCK.

33	Best Ox of any Pure or Cross Breed calved after 1st January 1864,	Medium Gold Medal.
	Second best,	The Silver Medal.
	Third best,	The Bronze Medal.
34	Best Ditto, after 1st January 1865,	Medium Gold Medal.
	Second best,	The Silver Medal.
	Third best,	The Bronze Medal.
35	Best Highland Ox calved after 1st January 1863,	Medium Gold Medal.
	Second best,	The Silver Medal.
	Third best,	The Bronze Medal.
36	Best Ditto, after 1st January 1864,	Medium Gold Medal.
	Second best,	The Silver Medal.
	Third best,	The Bronze Medal.
37	Best Cross Heifer calved after 1st January 1865,	Medium Gold Medal.
	Second best,	The Silver Medal.
	Third best,	The Bronze Medal.

CLASS II.—HORSES

FOR AGRICULTURAL PURPOSES.

Section		
1	Best Stallion foaled before 1st Jan. 1864,	Thirty Sovereigns.
	Second best,	Fifteen Sovereigns.
	Third best,	The Bronze Medal.
	Breeder of best Stallion,	The Silver Medal.
2	Best Entire Colt foaled after 1st Jan. 1864,	Twenty Sovereigns.
	Second best,	Ten Sovereigns.
	Third best,	The Bronze Medal.
3	Best Entire Colt foaled after 1st Jan. 1865,	Fifteen Sovereigns.
	Second best,	Eight Sovereigns.
	Third best,	The Bronze Medal.
4	Best Entire Colt foaled after 1st Jan. 1866,	Ten Sovereigns.
	Second best,	Five Sovereigns.
	Third best,	The Bronze Medal.
5	Best Mare (with Foal at foot) foaled before 1st Jan. 1864,	Twenty Sovereigns.
	Second best,	Ten Sovereigns.
	Third best,	The Bronze Medal.
6	Best Mare (in Foal) foaled before 1st Jan. 1864,	Fifteen Sovereigns.
	Second best,	Eight Sovereigns.
	Third best,	The Bronze Medal.
7	Best Filly foaled after 1st Jan. 1864,	Ten Sovereigns.
	Second best,	Five Sovereigns.
	Third best,	The Bronze Medal.
8	Best Filly foaled after 1st Jan. 1865,	Eight Sovereigns.
	Second best,	Four Sovereigns.
	Third best,	The Bronze Medal.
9	Best Filly foaled after 1st Jan. 1866,	Six Sovereigns.
	Second best,	Three Sovereigns.
	Third best,	The Bronze Medal.
	EXTRA HORSES.	
10	Best Draught Gelding or Mare in harness,	Medium Gold Medal.
	Second best,	The Silver Medal.
	Third best,	The Bronze Medal.

Section		
11	Best Gelding or Mare, not exceeding 15 hands, for Milk Carts of heavy draught,	Ten Sovereigns.
	Second best,	Five Sovereigns.
	Third best,	The Bronze Medal.
12	Best Gelding or Mare, not exceeding 14½ hands, for Milk Carts of light draught,	Ten Sovereigns.
	Second best,	Five Sovereigns.
	Third best,	The Bronze Medal.

CLASS III.—SHEEP.

LEICESTER.

1	Best Tup not above four shear,	Ten Sovereigns.
	Second best,	Five Sovereigns.
	Third best,	The Bronze Medal.
2	Best Dinmont or Shearling Tup,	Ten Sovereigns.
	Second best,	Five Sovereigns.
	Third best,	The Bronze Medal.
3	Best Five Ewes not above four shear,	Eight Sovereigns.
	Second best,	Four Sovereigns.
	Third best,	The Bronze Medal.
4	Best Five Shearling Ewes or Gimmers,	Eight Sovereigns.
	Second best,	Four Sovereigns.
	Third best,	The Bronze Medal.

CHEVIOT.

5	Best Tup not above four shear,	Ten Sovereigns.
	Second best,	Five Sovereigns.
	Third best,	The Bronze Medal.
6	Best Dinmont or Shearling Tup,	Ten Sovereigns.
	Second best,	Five Sovereigns.
	Third best,	The Bronze Medal.
7	Best Five Ewes not above four shear,	Eight Sovereigns.
	Second best,	Four Sovereigns.
	Third best,	The Bronze Medal.
	Best Pen of Lambs shown with Ewes,	The Silver Medal.
8	Best Five Shearling Ewes or Gimmers,	Eight Sovereigns.
	Second best,	Four Sovereigns.
	Third best,	The Bronze Medal.

BLACKFACED.

Section		
9	Best Tup not above four shear,	Ten Sovereigns.
	Second best,	Five Sovereigns.
	Third best,	The Bronze Medal.
10	Best Dinmont or Shearling Tup,	Ten Sovereigns.
	Second best,	Five Sovereigns.
	Third best,	The Bronze Medal.
11	Best Five Ewes not above four shear,	Eight Sovereigns.
	Second best,	Four Sovereigns.
	Third best,	The Bronze Medal.
	Best Pen of Lambs shown with Ewes,	The Silver Medal.
12	Best Five Shearling Ewes or Gimmers,	Eight Sovereigns.
	Second best,	Four Sovereigns.
	Third best,	The Bronze Medal.

SOUTHDOWN.

13	Best Tup not above four shear,	Ten Sovereigns.
	Second best,	Five Sovereigns.
	Third best,	The Bronze Medal.
14	Best Five Ewes not above four shear or Gimmers,	Eight Sovereigns.
	Second best,	Four Sovereigns.
	Third best,	The Bronze Medal.

LONG-WOOLLED OTHER THAN LEICESTER.

15	Best Tup not above four shear,	Ten Sovereigns.
	Second best,	Five Sovereigns.
	Third best,	The Bronze Medal.
16	Best Five Ewes not above four shear, or Gimmers,	Eight Sovereigns.
	Second best,	Four Sovereigns.
	Third best,	The Bronze Medal.

SHORT-WOOLLED OTHER THAN SOUTHDOWN.

17	Best Tup not above four shear.	Ten Sovereigns.
	Second best,	Five Sovereigns.
	Third best,	The Bronze Medal.
18	Best Five Ewes not above four shear, or Gimmers,	Eight Sovereigns.
	Second best,	Four Sovereigns.
	Third best,	The Bronze Medal.

CLASS IV.—SWINE.

Section		
1	Best Boar, large breed,	Eight Sovereigns.
	Second best,	Four Sovereigns.
	Third best,	The Bronze Medal.
2	Best Boar, small breed,	Eight Sovereigns.
	Second best,	Four Sovereigns.
	Third best,	The Bronze Medal.
3	Best Sow, large breed,	Six Sovereigns.
	Second best,	Three Sovereigns.
	Third best,	The Bronze Medal.
4	Best Sow, small breed,	Six Sovereigns.
	Second best,	Three Sovereigns.
	Third best,	The Bronze Medal.
5	Best pen of Three Pigs, not exceeding 8 months old, large breed,	Four Sovereigns.
	Second best,	Two Sovereigns.
	Third best,	The Bronze Medal.
6	Best pen of Three Pigs, not exceeding 8 months old, small breed,	Four Sovereigns.
	Second best,	Two Sovereigns.
	Third best,	The Bronze Medal.

EXTRA STOCK.

ANIMALS not included in the Sections for Competition may be exhibited as EXTRA STOCK, and will receive HONORARY PREMIUMS when specially commended.

CLASS V.—POULTRY.

SILVER-GREY DORKING.

1	Best Cock and 2 Hens,	The Silver Medal.
	Second best,	The Bronze Medal.
2	Best Cockerel and 2 Pullets,	The Silver Medal.
	Second best,	The Bronze Medal.

COLOURED DORKING.

3	Best Cock and 2 Hens,	The Silver Medal.
	Second best,	The Bronze Medal.
4	Best Cockerel and 2 Pullets,	The Silver Medal.
	Second best,	The Bronze Medal.

WHITE DORKING.

5	Best Cock and 2 Hens,	The Silver Medal.
	Second best,	The Bronze Medal.
6	Best Cockerel and 2 Pullets,	The Silver Medal.
	Second best,	The Bronze Medal.

Section		
	Coloured Cochin-China.	
7	Best Cock and 2 Hens, . .	The Silver Medal.
	Second best, ...	The Bronze Medal.
8	Best Cockerel and 2 Pullets, .	The Silver Medal.
	Second best, ...	The Bronze Medal.
	White Cochin-China.	
9	Best Cock and 2 Hens, . .	The Silver Medal.
	Second best, ...	The Bronze Medal.
10	Best Cockerel and 2 Pullets, .	The Silver Medal.
	Second best, ...	The Bronze Medal.
	Pencilled Bramahpootra.	
11	Best Cock and 2 Hens, . .	The Silver Medal.
	Second best, ...	The Bronze Medal.
12	Best Cockerel and 2 Pullets, .	The Silver Medal.
	Second best, ...	The Bronze Medal.
	Light Bramahpootra.	
13	Best Cock and 2 Hens, . .	The Silver Medal.
	Second best, ...	The Bronze Medal.
14	Best Cockerel and 2 Pullets, .	The Silver Medal.
	Second best, ...	The Bronze Medal.
	Malay.	
15	Best Cock and 2 Hens, . .	The Silver Medal.
	Second best, ...	The Bronze Medal.
16	Best Cockerel and 2 Pullets, .	The Silver Medal.
	Second best, ...	The Bronze Medal.
	Spanish.	
17	Best Cock and 2 Hens, . .	The Silver Medal.
	Second best, ...	The Bronze Medal.
18	Best Cockerel and 2 Pullets, .	The Silver Medal.
	Second best, ...	The Bronze Medal.
	Scotch Grey.	
19	Best Cock and 2 Hens, . .	The Silver Medal.
	Second best, ...	The Bronze Medal.
20	Best Cockerel and 2 Pullets, .	The Silver Medal.
	Second best, ...	The Bronze Medal.
	Golden Pencilled Hamburg.	
21	Best Cock and 2 Hens, . .	The Silver Medal.
	Second best, ...	The Bronze Medal.
22	Best Cockerel and 2 Pullets, .	The Silver Medal.
	Second best, ...	The Bronze Medal.
	Silver Pencilled Hamburg.	
23	Best Cock and 2 Hens, . .	The Silver Medal.
	Second best, ...	The Bronze Medal.
24	Best Cockerel and 2 Pullets, .	The Silver Medal.
	Second best, ...	The Bronze Medal.

Section		
	Golden Spangled Hamburg.	
25	Best Cock and 2 Hens, . . .	The Silver Medal.
	Second best, ...	The Bronze Medal.
26	Best Cockerel and 2 Pullets, .	The Silver Medal.
	Second best, . . . , .	The Bronze Medal.
	Silver Spangled Hamburg.	
27	Best Cock and 2 Hens, . . .	The Silver Medal.
	Second best, ...	The Bronze Medal.
28	Best Cockerel and 2 Pullets, .	The Silver Medal
	Second best, ...	The Bronze Medal
	White Crested Black Polish.	
29	Best Cock and 2 Hens, . . .	The Silver Medal.
	Second best, ...	The Bronze Medal.
30	Best Cockerel and 2 Pullets, .	The Silver Medal.
	Second best, ...	The Bronze Medal.
	Golden Spangled Polish.	
31	Best Cock and 2 Hens, . . .	The Silver Medal.
	Second best, ...	The Bronze Medal.
32	Best Cockerel and 2 Pullets, .	The Silver Medal.
	Second best, ...	The Bronze Medal.
	Silver Spangled Polish.	
33	Best Cock and 2 Hens, . . .	The Silver Medal.
	Second best, ...	The Bronze Medal.
34	Best Cockerel and 2 Pullets, .	The Silver Medal.
	Second best, ...	The Bronze Medal.
	Game—Black or Brown Reds.	
35	Best Cock and 2 Hens, . . .	The Silver Medal.
	Second best, ...	The Bronze Medal.
36	Best Cockerel and 2 Pullets, .	The Silver Medal.
	Second best, ...	The Bronze Medal.
	Game—Duckwings.	
37	Best Cock and 2 Hens, . . .	The Silver Medal.
	Second best, ...	The Bronze Medal.
38	Best Cockerel and 2 Pullets, .	The Silver Medal.
	Second best, ...	The Bronze Medal.
	Any other variety of Game.	
39	Best Cock and 2 Hens, . . .	The Silver Medal.
	Second best, ...	The Bronze Medal.
40	Best Cockerel and 2 Pullets, .	The Silver Medal.
	Second best, ...	The Bronze Medal.
	Bantams—*Game*.	
41	Best Cock and 2 Hens, . . .	The Silver Medal.
	Second best, ...	The Bronze Medal.
42	Best Cockerel and 2 Pullets, . .	The Silver Medal.
	Second best, ...	The Bronze Medal.

Section

BANTAMS—*Gold-laced Sebright.*

43	Best Cock and 2 Hens,	The Silver Medal.
	Second best,	The Bronze Medal.
44	Best Cockerel and 2 Pullets,	The Silver Medal.
	Second best,	The Bronze Medal.

BANTAMS—*Silver-laced Sebright.*

45	Best Cock and 2 Hens,	The Silver Medal.
	Second best,	The Bronze Medal.
46	Best Cockerel and 2 Pullets,	The Silver Medal.
	Second best,	The Bronze Medal.

ANY OTHER VARIETY OF BANTAMS.

47	Best Cock and 2 Hens,	The Silver Medal.
	Second best,	The Bronze Medal.
48	Best Cockerel and 2 Pullets,	The Silver Medal.
	Second best,	The Bronze Medal.

ANY OTHER DISTINCT BREED OF POULTRY.

49	Best Cock and 2 Hens,	The Silver Medal.
	Second best,	The Bronze Medal.
50	Best Cockerel and 2 Pullets,	The Silver Medal.
	Second best,	The Bronze Medal.

CAPONS—*Of any Breed.*

51	Best 3 Capons,	The Silver Medal.
	Second best,	The Bronze Medal.

DUCKS—*White Aylesbury.*

52	Best Drake and 2 Ducks,	The Silver Medal.
	Second best,	The Bronze Medal.
53	Best Drake and 2 Ducklings,	The Silver Medal.
	Second best,	The Bronze Medal.

DUCKS—*Rouen.*

54	Best Drake and 2 Ducks,	The Silver Medal.
	Second best,	The Bronze Medal.
55	Best Drake and 2 Ducklings,	The Silver Medal.
	Second best,	The Bronze Medal.

DUCKS—*Any other distinct Breed.*

56	Best Drake and 2 Ducks,	The Silver Medal.
	Second best,	The Bronze Medal.
57	Best Drake and 2 Ducklings,	The Silver Medal.
	Second best,	The Bronze Medal.

Section		
	TURKEYS—*Black Norfolk.*	
58	Best Cock and 2 Hens,	The Silver Medal.
	Second best,	The Bronze Medal.
59	Best Cock and 2 Hens, (Poults,)	The Silver Medal.
	Second best,	The Bronze Medal.
	TURKEYS—*Any other Breed.*	
60	Best Cock and 2 Hens,	The Silver Medal.
	Second best,	The Bronze Medal.
61	Best Cock and 2 Hens, (Poults,)	The Silver Medal.
	Second best,	The Bronze Medal.
	GEESE—*Grey Toulouse.*	
62	Best Gander and 2 Geese,	The Silver Medal.
	Second best,	The Bronze Medal.
63	Best Gander and 2 Goslings,	The Silver Medal.
	Second best,	The Bronze Medal.
	GEESE—*Embden.*	
64	Best Gander and 2 Geese,	The Silver Medal.
	Second best,	The Bronze Medal.
65	Best Gander and 2 Goslings,	The Silver Medal.
	Second best,	The Bronze Medal.

GENERAL SHOW OF STOCK AND IMPLEMENTS
AT
ABERDEEN, 1868.

CATTLE.

Premiums will be Offered for the following Classes.

SHORT-HORN.

Bulls calved before 1st January	1866
Bulls calved after 1st January	1866
Bulls calved after 1st January	1867
Cows of any age.	
Heifers calved after 1st January	1866
Heifers calved after 1st January	1867

POLLED ANGUS OR ABERDEEN.

Bulls calved before 1st January	1866
Bulls calved after 1st January	1866
Bulls calved after 1st January	1867
Cows of any age.	
Heifers calved after 1st January	1866
Heifers calved after 1st January	1867

POLLED GALLOWAY.

Bulls calved before 1st January	1866
Bulls calved after 1st January	1866
Bulls calved after 1st January	1867
Cows of any age.	
Heifers calved after 1st January	1866
Heifers calved after 1st January	1867

HIGHLAND.

Bulls calved before 1st January	1865
Bulls calved after 1st January	1865
Bulls calved after 1st January	1866
Cows of any age	
Heifers calved after 1st January	1865
Heifers calved after 1st January	1866

AYRSHIRE.

Bulls calved before 1st January	1866
Bulls calved after 1st January	1866

Cows in milk of any age.	
Cows in calf of any age.	
Heifers calved after 1st January	1866

FAT STOCK.

Polled Oxen calved after 1st January	1865
Polled Oxen calved after 1st January	1866
Oxen of any other pure or cross breed calved after 1st January	1865
Oxen of any other pure or cross breed calved after 1st January	1866
Highland Oxen calved after 1st January	1864
Highland Oxen calved after 1st January	1865
Cross-bred Heifers calved after 1st January	1865
Cross-bred Heifers calved after 1st January	1865

HORSES

For Agricultural Purposes.

Stallions foaled before 1st January	1865
Entire Colts foaled after 1st January	1865
Entire Colts foaled after 1st January	1866
Entire Colts foaled after 1st January	1867
Mares with foal at foot, foaled before 1st January	1865
Mares in foal, foaled before 1st January	1865
Fillies foaled after 1st January	1865
Fillies foaled after 1st January	1866
Fillies foaled after 1st January	1867

SHEEP.

LEICESTER.

Tups not more than four shear.
Dinmont or Shearling Tups.
Ewes not more than four shear.
Shearling Ewes or Gimmers.

CHEVIOT.

Tups not more than four shear.
Dinmont or Shearling Tups.
Ewes not more than four shear.
Shearling Ewes or Gimmers.

BLACKFACED.

Tups not more than four shear.
Dinmont or Shearling Tups.
Ewes not more than four shear.
Shearling Ewes or Gimmers.

SOUTHDOWN.

Tups not more than four shear.
Ewes not more than four shear, or Gimmers.

LONG-WOOLLED OTHER THAN LEICESTER.

Tups not more than four shear.
Ewes not more than four shear, or Gimmers.

SHORT-WOOLLED OTHER THAN SOUTHDOWN

Tups not more than four shear.
Ewes not more than four shear, or Gimmers.

EXTRA SHEEP.

Blackfaced, Cheviot, and Cross-bred Wethers.

NOTE.—*Ewes, Gimmers, and Wethers, to be exhibited in pens of five, and in the Cheviot and Blackfaced Breeds, Ewes must be in milk with lambs at foot.*

SWINE.

Boars, large breed.
Boars, small breed.
Sows, large breed.
Sows, small breed.
Pigs not exceeding 8 months old, large breed.
Pigs not exceeding 8 months old, small breed.

POULTRY.

COCK and 2 HENS, COCKEREL and 2 PULLETS of each of the following breeds:—

Silver-Grey Dorking.
Coloured Dorking.
White Dorking.
Coloured Cochin-China.
White Cochin-China.
Pencilled Brahmapootra.
Light Brahmapootra.
Malay.
Spanish.
Scotch Grey.
Golden Pencilled Hamburg.
Silver Pencilled Hamburg.
Golden Spangled Hamburg.
Silver Spangled Hamburg.
White-crested Black Polish.
Golden Spangled Polish.
Silver Spangled Polish.
Game—Black or Brown Reds
Game—Duckwings.
Game—Any other variety.
Bantams—Game.
Bantams—Gold-laced Sebright.
Bantams—Silver-laced Sebright.
Bantams—Any other variety.
Any other distinct Breed of Poultry.
Ducks—White Aylesbury.
Ducks—Rouen.
Ducks — Any other distinct Breed.
Turkeys—Black Norfolk.
Turkeys—Any other Breed.
Geese—Grey Toulouse.
Geese—Embden.
Capons (coops of 3).

VETERINARY COLLEGE.

This establishment is conducted by Professor Dick, assisted by Dr. Allen Dalzell, Dr. Young, Mr. Strangeways, and Mr. Worthington. The curriculum embraces the Principles and Practice of Veterinary Medicine and Surgery, with Anatomy, Physiology, and Demonstrations; Chemistry; Materia Medica and Dietetics; and the general management of domesticated Animals.

Students have the advantage of assisting in an extensive practice, and of performing the different operations which most frequently occur.

Attendance on Two Courses is required before a Student is taken upon trial for Diploma; the examinations are conducted by leading members of the Medical Faculty and of the Veterinary Profession; Graduates of the College are eligible for appointment as Veterinary Surgeons in her Majesty's service.

The Session commences in the beginning of November, and is concluded before the end of April following.

AGRICULTURAL EDUCATION.

The following Bye-Laws have been enacted under the authority of the Supplementary Charter of 1856, and in terms of the Report by the Council on Education thereby created:—

BYE-LAWS.

I. That in terms of a report by the Council on Education the following Board of Examiners be appointed:—

Science and Practice of Agriculture—Mechanics and Construction.—Professor Wilson; George Hope, Fenton Barns; Robert Russell, Pilmuir; and John Wilson, Edington Mains.

Botany.—Professor Balfour.

Chemistry.—Professor Anderson.

Natural History.—Professor Allman.

Veterinary Surgery.—Professor Dick.

Field Engineering and Surveying.—Professor Macquorn Rankine and David Stevenson, C.E.

Book-keeping and Accounts.—Kenneth Mackenzie, C.A., and Archibald Paterson, Meadowfield.

II. That the examination shall be both written and oral; that the value of the answers shall be determined by numbers; and that the oral examination shall be public.

III. That there shall be two examinations, to be styled respectively the "Certificate Examination," and the "Diploma Examination." The first to be open to candidates not less than eighteen years of age; the second to those who have completed twenty-one years.

IV. That to pass the "Certificate Examination" a candidate must be acquainted with farm accounts, mensuration and surveying, and must possess a good knowledge of practical agriculture, and a general acquaintance with the elements of botany, chemistry, and natural history.

V. That a certificate in the following terms, signed by the President or Vice-President of the Council on Education, and by the Secretary, shall be granted to candidates passing this examination:—

"We hereby certify that A. B. has been examined, and has been found to possess a knowledge of farm accounts, mensuration and surveying, a good knowledge of practical agriculture, and a general acquaintance with the elements of botany, chemistry, and natural history, and that he is therefore entitled to present himself for the further examination, in terms of the regulations, for the Society's diploma."

VI. That to pass the "Diploma Examination" a candidate must be in possession of the certificate, and have attained his 21st year, and must be found to possess a thorough knowledge of the theory and practice of agriculture; of mechanics and mensuration; of the physiology and treatment of domesticated animals; and of the applications of botany, chemistry, and natural history to agriculture.

VII. That a diploma in the following terms, bearing the corporate seal of the Society, and signed by the President or Vice-President of the Council on Education, and by the Secretary, shall be granted to candidates passing the second examination:—

"These are to certify that on the day of A. B. was examined in the arts and sciences connected with agriculture, and has been reported to be proficient therein by a Board of Examiners nominated by the Council of the Highland and Agricultural Society of Scotland on Education, in terms and by authority of a Charter, given under the Great Seal, on the 18th day of August, 1856."

VIII. That a sum not exceeding £100 per annum shall be placed at the disposal of the Examiners, to be applied in prizes to candidates who pass with distinguished merit, and on a standard exceeding that required for the diploma.

CHEMICAL DEPARTMENT.

The objects of the Chemical Department are threefold :—

I. The prosecution of researches in various subjects connected with Agricultural Chemistry, the results of which are published at intervals in the Transactions.

Dr. Anderson will be glad at all times to receive suggestions from Members of the Society regarding subjects they may consider worthy of investigation, and which will be laid before the Chemical Committee.

II. To assist in the performance of minute and accurate Field Experiments.

For this purpose it has recently been resolved to institute field experiments on a systematic plan, and in such a manner as to obtain exact and comparable results. The experiments will be conducted in different districts under the superintendence of a Committee, who will fix the precise nature of those to be made in each year, and see that the precautions required to secure accuracy are properly attended to. The furnishing the requisite chemical data for these researches will in future form an important part of the business of the laboratory. Gentlemen who have any suggestions to make regarding subjects deserving investigation are requested to communicate with Dr. Anderson.

III. The performance of Analyses of Manures, Soils, Vegetable Products, &c., for members of the Society at reduced fees.

In purchasing manures, cattle foods, &c., Members are recommended, in all cases to do so by guaranteed analysis, and to ascertain that the article delivered corresponds with it. Partial analyses, such as Nos. 6 and 7 of the accompanying list, will generally suffice to check the correspondence of the stock with the guarantee, and give an *approximate*, though not a precise estimate of its value. When an *exact* estimate is required, a complete analysis is necessary.

Samples intended for analysis should be sent (carriage paid) addressed to Dr. ANDERSON, 15 SHUTTLE STREET, GLASGOW, and when of small size, they are most cheaply and expeditiously forwarded *by post*. They should be distinctly labelled, marked with the name and address of the sender in full, and accompanied by a letter, specifying the particular analysis required, according to its number in the following list,—and, if possible, the object in view,—as, by doing so, much trouble and delay will occasionally be saved.

Much inconvenience having been experienced by persons sending samples for Analysis which had not been selected with sufficient care, and were afterwards found not to represent the average composition of the substance, it is particularly requested that the following instructions may be attended to as closely as circumstances will permit:—

INSTRUCTIONS FOR SELECTING SAMPLES FOR ANALYSIS.

Manures.—A large double handful of the Manure should be taken from each of *at least* five or six different bags; and if any lumps are found in it, a due proportion of these should also be taken. The whole being laid on a large sheet of paper, should be carefully mixed by rubbing with the hand, the lumps being broken down and mixed as uniformly as possible with the powdery part. If this mixture be carefully made, a quantity of it not exceeding *two ounces* will suffice for the analysis. It should be folded up in tinfoil to prevent its becoming dry. In default of tinfoil, the sample may be wrapped in double folds of strong writing paper. Should the manure contain stones, or be very moist, or should any difficulty be experienced in making a uniform mixture, it is desirable that *two or three pounds* should be sent.

Soils.—In selecting Soils for analysis, five or six spadefuls should be taken from different parts of the field, and after being spread out in a thin layer for several days to dry, should be put two or three times through a fine sieve, so as to insure uniform mixture. For a complete analysis, not less than *two pounds* should be sent; for a partial analysis, three or four ounces will be sufficient.

Waters.—For the complete analysis of a Water, from *two to three gallons* are required; for the determination of the amount of salts in solution, and lime thrown down by boiling, *two quarts* will suffice. A well water may be selected at any time; but the water of a spring or running stream should be taken in dry weather. The jars or bottles in which they are sent must be tightly corked and sealed. In the analysis of a mineral water, it may sometimes be desirable to determine the amount of gases held in solution; in which case certain precautions must be observed which require the presence of a chemist at the spring.

Limestones, Clays, Ironstones, &c.—If the bed of any of these substances of which the analysis is required be very uniform in appearance, a piece of two or three ounces weight taken from any part of it will be enough for analysis; but in all cases it is better to send three or four chips from different parts of its thickness. Sometimes where the characters of different parts of the bed vary much, separate analyses of these portions may be requisite, in which case two ounces of each may be sent.

The following are the rates at which analyses, &c., are furnished to *Members of the Society*, and it is requested that the fee be remitted along with the sample:—

1. Complete analysis of a Soil, including determination of Alkalies and Phosphates, £3.
2. A partial analysis of a Soil, such as the determination of the quantity of Organic Matter, and relative proportion of Clay, Sand, and Carbonate of Lime it contains, 10s.
3. Quantitative determination of any one ingredient of a Soil, 7s. 6d.
4. Complete analysis of Saline Manures and other substances, such as Gypsum, Nitrates of Soda and Potash. Ammoniacal Salts, Guano, Oil-cake, Bone-dust, Rape-dust, Superphosphate of Lime, £1.
5. Testing the above substances for adulterations—for each sample, 5s.

   This examination is generally sufficient to determine whether or not any of these substances are grossly adulterated, but it gives no idea of the comparative value of different Samples, where all are genuine.
6. Determination of the percentage of Phosphates and Ammonia in a Guano, 10s.
7. Determining the quantity of Soluble and Insoluble Phosphates in a Superphosphate, 10s.

   This and the preceding determination generally suffice to show whether the sample is of fair quality, and corresponds with the analysis by which it was sold, but not to fix its exact commercial value.
8. Complete analysis of Limestones, Marl, Shell-sands, &c., £1.
9. Examining any of the above substances for the quantity of Lime, and ascertaining in the same the presence of Magnesia and Alumina, 7s. 6d.

   Ascertaining the proportion of these, 2s. 6d. additional for each substance.
10. Complete analysis of the Ash of any Plant, £3.
11. Complete analysis of a Water, £2.
12. Determination of the amount of Salts in Solution, and of the Lime thrown down by boiling in any water, 10s.
13. Analysis of Tile or Fire Clay, £1 10s.
14. Complete analysis of Roots, Grains, and other Vegetable Products, £1.
15. Examining products of Vegetation, or of the Dairy, such as Nutritive Matters in Wheat, or other grain—quantity of Butter or Cheese in Milk—5s. for each ingredient.

16. Determination of the quantity of Nitrogen in any substance, 7s. 6d.
17. Answers to letters asking advice on subjects within the department of the chemist, 5s.

The charges for other Analyses not specified in the list will be settled by the Committee of Management, with reference to the amount of work which they involve, and on a scale similar to the above.

ALEXR. MACDUFF, *Secretary.*

EDINBURGH, *February*, 1866.

REPORT ON THE DISEASES OF FARM HORSES.

By GEORGE ARMATAGE, M.R.C.V.S., Professor of Anatomy and Physiology, Glasgow Veterinary College, late of the Albert Veterinary College, London.

[*Premium—Ten Sovereigns.*]

INTRODUCTORY REMARKS.

THE diseases of farm horses are various and often numerous, and prevail in accordance with climate, locality, pasturage, exposure, and domestic treatment, &c., &c.

As a means of preserving the usefulness of the horse—no matter for what purpose he is set apart—much will depend upon the system of management, both as regards the stables and work. The proper principles, as a theme for separate discussion, would amply repay for immediate consideration and adoption. The want of due care by those in whom confidence is placed, and who are entrusted with the charge of horses, is also the source of much inconvenience and loss, by leading to accidents and the infliction of injuries. In total ignorance, and with a view of improving or adding to nature, much brutality is often inflicted; and by allowing meddling grooms and horse-keepers to exercise their skill, the origin of which is of the most doubtful character, I have seen injuries produced, terminating in fatal disease; and in consequence of their desire to keep matters secret, delay is occasioned, when even extraordinary measures will then fail to realise a desirable and profitable change.

It is impossible within the limits of such a paper as this to do more than epitomise the various ailments of the farm horse. His diseases and their prevention would best appear side by side as a special subject considered at length, and as such strictly followed up would be found highly profitable to him who studies and adopts the same.

The following classification of the maladies to which farm horses are liable will be followed in this paper:—

1. Diseases of the Masticatory and Digestive Organs.
2. Skin Diseases.
3. Blood do.
4. Hereditary do.
5. Diseases of the Nervous System.
6. „ „ Respiratory Organs.
7. „ „ Urinary Organs.
8. „ „ Organs of Vision.
9. „ „ Feet.
10. „ „ Organs of Locomotion.

DISEASES OF THE MASTICATORY AND DIGESTIVE ORGANS.

It is not uncommon that disease follows closely upon disorder of one or more organs, and particularly so with reference to those whose office is to provide the nutriment for the body—the digestive organs. Disease also follows closely on apparently slight injuries to the masticatory apparatus—the mouth, tongue, and fauces. To these I shall first direct attention.

In this nineteenth century, when we would consider, in accordance with the march of intellect, any subject which ministers to the wants and profit of men, the welfare of that useful animal, the horse, would in common claim an equal share of enlightened consideration. Such, however, is not the case. He is left to the care of those who should know better, but unfortunately do not—to those whose meddling propensities are of the most reprehensible kind, and whose judgment effectively carried out is of the most expensive character.

Nearly every groom possesses unbounded confidence in his powers of breaking horses, and in his operations feels it necessary *to give the animal a mouth*. This is quite as indispensable with the professional breaker. To effect this, that relic of a barbarous age is made use of—the *lungeing bit*—by the use of which I have seen the animal suffer excruciating pain. The angles of the mouth are under extraordinary pressure, owing to the size of the bit and tight strapping from behind; inflammation succeeds, abscesses form, and, after discharging their contents, terminate in an established opening through the cheek into the mouth, large enough to admit of the passage of a finger. The same state also results from nails, thorns, and splinters of wood being taken up in the food and becoming lodged in the substance of the cheek.

In the vicinity of a large manufacturing town where I resided I had many cases of this kind, and not unfrequently opened abscesses in which such substances were found. The same have also been found tightly wedged between the teeth, giving rise to indefinite injury to the tongue and cheek. In one instance I found the tongue half divided by the use of the sharp bit which had been placed in the mouth, with tight straps from the roller—the animal having been kept for hours by the breaker in that position in a loose box. Cords have been tied to the tongue, to cause the animal to proceed at a faster pace, and sometimes tied to the gate, rails, &c., with the tongue and jaw included in a hitch knot; the end is stoppage of circulation, mortification or death of the parts, and loss of a portion of that useful organ. I have known death ensue; but in cases of recovery the animal is prevented taking food and drink readily. There is a consequent loss of condition and corresponding inability for work.

Those who are fond of prescribing on their own experience are seldom bold enough to ensure the proper administration of their medicines by intrusting their hand in the animal's mouth, and therefore resort to the use of a sharp-pointed stick. By this the posterior portion of the mouth is seriously injured in many cases; tumefaction and pain result, the animal cannot eat, fever sets in—he dies. Few cases of this kind recover; and a man who feels such confidence in his ability to state what variety of medicine the horse requires should have as much love for him as to afford him a more rational mode of passing it over his gullet.

The *Symptoms* of these several states are much alike, consisting of dullness, loss of appetite, discharge of saliva from the mouth, more or less movement of the jaws, and in the case of loss of portion of the tongue the poor creature places his head, almost up to the eyes, in water when he attempts to drink. There are also indications of fever, which will be severe in accordance with the nature of the existing disease; the bowels are costive, urine high coloured, and belly tucked up. These states increase until the lungs are congested, and the animal dies.

The *Treatment* consists in opening the abscesses in the cheek as early as possible. If allowed to proceed until a natural evacuation of the contents takes place, the healing process in the wound becomes tardy, or sloughing takes place from irritation by foreign bodies as food, &c., passing outwards during mastication. While a healthy state exists, little more need be done save keeping the parts clean, and applying the zinc lotion. If sloughing has commenced, and the orifice increases, strong spirits of camphor, diluted nitric or hydrochloric acid, may be used, and in inveterate cases nitrate of silver or the hot iron, to arouse the vitality of the parts and promote the healing action, will be required.

DENTITION.—During the process of teething, the horse frequently suffers from a feverish state of the system, by which the usual functions are more or less interfered with, in some instances to a very considerable extent. It is at this time, under an imperfect acquaintance with nature's laws and her dealings with the animal economy, that mistakes occur, and he is said to be breeding strangles, or a host of other diseases, which, for sake of convenience, are comprehended under the ambiguous term "*distemper*."

During the past year, upwards of fifty animals have been under my care for this condition alone, and varying in age from one to four and a-half years, many of which, having been badly fed during the previous winter, suffered extremely at the time when demands were made upon them, and rapid progress in growth should have been made.

Teething is attended with great danger in the human subject —convulsions, as a result of the attendant fever, being always dreaded. Although we cannot go so far as to assert that such extremes are the rules so far as regards our equine patients, there is still no doubt whatever that they do not suffer one whit the less. Not only is the process of shedding peculiar to the front or incisor teeth, but also is a property conferred upon the molars or grinders, six of which are placed above and below, on either side of each jaw, in the back part of the mouth, almost beyond observation. Although the milk or temporary teeth are produced with apparently little difficulty, up to the age of twelve months, after that period, to nearly five years, these are removed gradually and in successive pairs, others starting beneath, and causing their attachments to become daily more insecure, still, however, adhering to the sensitive structures which form a portion of the surrounding tissues. Motion of the jaws produce a clicking, whistling sound, the ragged teeth are displaced, irritation of the cheeks and tongue, as well as gums, ensue, which gives rise to the following

Symptoms.—There is considerable fever, increased pulse, with partial or total loss of appetite, and other disturbed functions, and in a majority of cases considerable fœtor of breath. The tongue is fevered, dry, and hot. Mastication is a great difficulty, and although there is an evident desire for food, each scrap is seized by the lips, but dropped without being taken farther in. At other times, particularly in the early stages and mild cases, portions are partially chewed and dropped. This is called "*quidding*" the food. At length the shell teeth are detached, and often found in the manger, when afterwards each day the difficulty of mastication becomes less. In some instances the debility is so great, especially in neglected cases, that nothing short of absolute nursing and good support by soft and nutritious food will be of benefit. Under these conditions tumefaction of the gums and palate is observed, for which true ignorance prescribes the actual cautery at a succession of intervals, until the imaginary disease, "Lampas" so called, shall disappear. During which the poor creature is doomed to endure an indefinite amount of additional and unnecessary pain. At other times a ruder kind of scarification is performed by means of sharply pointed horse nails; these being forcibly pushed through the palate causes hemorrhage from the blood vessels, and not unfrequently, by penetrating the bones beyond, cause disease of them. Penknives are also used, by which the artery of the palate is divided, and a flow of blood produced, which proves difficult to arrest, and of great danger.

In aged animals, the teeth, particularly the molars, exhibit irregularities, which also prove of great inconvenience. There is no reason to doubt the horse suffers acutely from toothache; his teeth become carious, and in consequence of exposure of the dental nerve, endures the too well known twinge, and may be seen lying, his head on the manger, or standing gloomily at some distance from the much desired food. The breath discloses the real state of things—food within the cavity of the tooth undergoing the putrefactive stage, imparts its noisome odour. The animal loses condition, and as the affected tooth softens and breaks down, its antagonist grows, and having nothing to keep it in check by natural wear, assumes an inordinate length. It is at this time that much additional pain is experienced by the constant approximation of the monster tooth with the softened and diseased structures opposite; inflammation of the bones, &c., takes place, and a discharge from the nostrils of various characters will indicate either the maturation of an abscess, or softening and caries of the bones, exhibiting in such cases facial tumours, which in the end may defy art and science to restore to a state of health and usefulness.

The catalogue of complaints in connexion with, or resulting from, teething, are numerous and exceedingly troublesome after time has been allowed to elapse. In early stages but simple measures are needed, which may be said always to be successful. These are early attention to the mouth; remove when possible all ascertained loose shell teeth; keep the bowels under proper action, which, after a judicious dose of laxative medicine, can be easily accomplished by bran mashes, or boiled corn when necessary, succulent food, as green clover, grass, turnips, parsnips, carrots, &c., &c., allowing for drink hay tea, and a cool, loose box in summer, with adequate clothing under changeable temperature.

With reference to the farm horse, descriptions of the foregoing diseases, and the injunctions concerning them, may appear superfluous, but as a result of some years' practical acquaintance with such states, I am confident that in his case, were greater attention paid at proper seasons, many animals would be preserved to the farmer in all their valuable usefulness, and others would be saved which now fall victims to the results of allowing such diseases to arise and proceed unheeded, unaided, in the belief that assistance is not required, and that all will end well.

CHOKING is not uncommon in some districts in the farm horse, from various kinds of food supplied; turnips, carrots, and other roots are apt to be devoured greedily, and pieces become lodged in the Œsophagus or gullet. Dry bran, bean meal, wheat chaff, &c., form a prolific source of inconvenience to the farm horse at times. From a succession of these events injury to the surrounding parts ensues, and the symptoms recur at short intervals. Injuries occur from pieces of root which are too large to be easily swallowed, and probably having large protruding angles; they may lodge in their passage down the gullet. If muscular contractions occur, which are most likely, removal is difficult, and often attended with danger, particularly in the hands of inexperienced individuals. Acute choking sometimes occurs from the dry state of food supplied to a hungry animal after hours of fast, and some will habitually choke from ordinary hay and corn after a hard day's work, which points to a weakened state of the vital powers. No disease or malformation of the gullet may exist, and still this may happen. In fact, in cases of illness, a bolus of food or medicine may often be observed to remain midway for some time until water be swallowed; and in several cases of death which have occurred from other diseases, this state has been exemplified by the presence of the ball or pellet being found in that portion of gullet within the chest. On some parts of the continent horses are supplied with a continual stream of water in one half of the manger, at which the animals alternately drink and feed—an excellent practice, which some of our extensive proprietors would do well to follow.

Symptoms of Choking in the horse are very characteristic, even in mild cases, consisting of cough, and attempts to gulp, sudden contractions of the muscles of the neck, chest, and abdomen, during which the nose is brought backwards to the chest, and profuse salivation is generated, which consists of a ropy discharge; the pulse is not frequently influenced in the first instance, but as symptoms increase, it becomes quick and irritable. The eyes are protruded, staring, and even bloodshot; the cough becomes more severe and constant; the animal stamps and scrapes with the fore feet; distention takes place from fermentation and elimination of gases within the stomach; and the discharge of saliva increases. Fluids administered are forcibly returned, gulping is more frequent and determined, breathing becomes laboured and *stertorous*, from pressure on the windpipe in sudden or severe cases. And if the malady is attended with rupture of the Œsophagus, great irritation and fever ensues from food extravasated among the contiguous muscles, and the creature dies in the greatest agony.

Treatment.—When the seat of obstructions of the gullet are visible, after determining the nature of the offending body, gentle manipulation externally with the hands, assisted by small quantities of linseed oil, frequently succeeds in removing it. In cases of known debility, stimulants, as brandy, &c., will form a most useful addition. The Veterinary Surgeon, however, will exceed this, by the use of others of greater value, as sulphuric ether, nitric ether, spirits of ammonia, in doses of one ounce. Pieces of turnip, mangold, &c., often prove intractable and dangerous. Spasm of the gullet increases the tenacity with which they are held *in situ*, and if laceration of the coats of the gullet have not already taken place, it is to be dreaded in an attempt to remove it by the probang. That instrument, therefore, should be used with great caution, and to render its use more safe, a dose of oil and stimulant, as already advised, should be administered in the first instance.

When the obstruction is placed at the back part of the mouth, the jaws being kept apart by the balling iron, the offending object may be withdrawn. Pharyrgeal polypi sometimes give rise to the previously described symptoms, when the aid of an experienced Veterinary Surgeon must be sought for its removal.

Horses are not so patient under suffering from obstructions in the gullet as cattle, and not unfrequently are violent and unmanageable. The acute angle at the back part of the mouth in the horse also prevents the passing of the probang so effectually as in ruminants, whereby the operator acts under disadvantages, an additional reason for greater care and watchfulness in attempting to give relief by its use. The following are the ordinary precautions to be observed:—

A wooden gag with a round hole in the centre to admit the probang, should be placed in the mouth, and secured by side-straps, similar to those of a head stall or bridle. I have found a Balling Iron, about three inches wide, a much more serviceable instrument, as it prevents the animal getting the bulb of the probang between the grinders, a result best avoided for obvious reasons. A twitch is placed on the nose, and held by assistant No. 1. Assistants Nos. 2 and 3, one on each side, seize the ear with one hand, while the other is laid flat on the front of the nose to keep it steady, or one holds the halter. A fore foot may be held up by assistant No. 4, or strapped up according to convenience. The animal being previously reversed in the stall, the instrument is to be passed. The probang usually consists of stout wire, coiled so as to form a tube, six or seven feet long, having two leaden extremities, one a bulb, the other a cup, both of which are perforated; the intermediate space is covered with leather. Having made choice of the end to be used, it is passed through the opening in the gag, backwards to the gullet, along the centre of the mouth—

avoiding the teeth as much as possible, towards which it is pushed by the animal's tongue; and having fully ascertained by one hand, that it has safely passed down into the gullet, it should be gently pushed down to the obstruction, and then, by firm steady pressure, forced down into the stomach. It is here where the animal will evince his violence, therefore the operator will do well to make choice of reliable men, who will maintain their hold, as fatal injuries may arise as much from the animal's violence as from the operation or obstruction.

After relief has been obtained by the probang, I have found on many occasions that symptoms such as gulping, eructation, arching the neck with spasmodic muscular action, remains for some time; this is, doubtless, owing to the irritation set up by the foreign body. They, however, gradually subside, and in a few hours, the animal resumes his food. The after treatment consists in allowing thin gruel, or hay tea for drinks, with light, digestible food in small but repeated quantities.

From a succession of these events, injury to the surrounding parts is certain to result, as from a variety of causes, horses sometimes become habitual chokers. The muscular portion of the Œsophagus, from laceration or stretching with debility of nervous power, admits of a pouch or sac being formed, in which food is lodged and accumulates, and from inaction or feebleness it cannot be well passed on to the stomach. Sometimes this dilatation also occurs in the Œsophagus at the cardiac or anterior portion of the stomach, when in addition to symptoms of choking, we have a regurgitation of food midway or higher up the gullet, and passage downwards, and not unfrequently vomition. These states are known by the name of Sacculous Dilatation of the Œsophagus, or Œsophagus Ventriculosus of some writers.

A grey horse which came under my observation recently, having a sacculous state of the gullet, resulting from the above causes, always after being brought to the stable from work, and consumed his food, commenced with symptoms of choking, which ended in perfect vomition, half a peck or more of injesta being returned, mainly by the nostrils. During the premonitory symptoms of vomition, the food passes regularly up and down the gullet, from the point of obstruction towards the jaws; at length the stomach being filled to repletion by hurried acts, and other causes developed, the phenomenon is fully and effectively brought about.*

The most effectual mode of dealing with such cases is to adopt a regular system of feeding and watering, with moderate quantities at once at shorter intervals, which was highly successful in the instance quoted above, and will be found equally so in most others of the class.

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* The animal here alluded to belonged to the Hetton Coal Company, near Durham, and is now working well under the system advocated by my friend, Mr. Luke Scott, M.R.C.V.S.

In fact, what may be said of preventive measures in the preceding diseases will also apply to those immediately to be discussed. If owners consult their own advantages and benefit, they would also diminish much animal suffering, by looking into the system of feeding and work, immediately on the appearance of a case of the kind among their animals.

Some or all the symptoms of choking and obstruction will also be present in cases of membranous degeneration of the gullet, states which are accompanied by special characteristics—familiar only to the professional man—and running into conditions of an irremediable nature.

Rupture of the gullet takes place under certain circumstances, apart from those which we have been considering. It has occurred in my practice on several occasions; in one instance, a farm colt foal which was left in a stable alone, anxious after every footstep, supposing them to be those of its dam, and jumping up to a window, came in violent contact with a nail standing out from the wall. In a second, a horse was fed while at work—a tight collar, it is supposed, prevented the passage of food downwards, an accumulation took place, symptoms of distress set in, he fell and struggled, and after several days, died. In the surrounding space amongst the muscles, in both cases, was a large mass of half masticated hay, &c., which had issued from a long rent in the gullet.

DYSPEPSIA.—This is a condition more frequently met with in farm and other horses than is commonly stated, which from experience gained among these animals, I consider merits a place in this treatise under the above name. That such has not hitherto met with a place in our veterinary literature, is no justification for its omision here.

Nature.—Dyspepsia is a condition, as already found, apart from any structural lesion; the organs affected are the stomach, and, probably, generally the liver, pancreas, and glands of the intestines.

Causes.—Over-feeding, long fasts, with hard work. The practice of cramming animals at one time, and starving at another, is a prolific source, particularly when the food supplied is of a coarse or inferior kind. Defective teeth, which lead to an imperfect mastication of food, and food of an indigestible character, will produce Dyspepsia.

Symptoms.—There is an evident dullness about the animal, particularly at work, the coat stares, and has lost its bright glossy appearance, the belly is tucked up, appetite capricious or diminished, and occasionally the animal may be seen licking the walls of the stable. Quantities of undigested food are found in the evacuations, such as oats, not having undergone the process of mastication, and sometimes griping pains may be observed. Flatus is discharged continuously, and occassionally slight diarrhœa is present.

Treatment.—Establish a regular and systematic course of diet, in accordance with the animal, such as easily digested food, the best condiment for which is common salt, taking care the stomach is not overloaded, but rather offering the supplies in small but oft repeated quantities. In those advanced cases, which do not give way to the foregoing, administer a purgative, and use enemas; and if the appetite is lost, use powdered gentian and carbonate of soda, two drams each night and morning in a ball. It is not wisdom to use much medicine in these disorders, as if properly managed, the case will recover in ample time without, and even when any assistance is required, the above simple remedies are generally sufficient. Next, allow moderate exercise, a run at grass in summer, or a supply of washed roots in winter, as carrots or turnips, parsnips, &c.

Long neglected cases of this kind I have frequently found to terminate in severe and incurable states, particularly in horses belonging to poor and careless farmers. Some persons' horses are never in condition, simply because they are badly housed, ill fed, hard worked, and otherwise inhumanly treated. In farm-horses there is always to be made a profit by their greater efficiency, as rendered by proper care and food. It, therefore, cannot be otherwise than a most unprofitable proceeding, to even half keep an animal who can only accomplish one quarter of the work required of him, and suffer deterioration by the vicissitudes thus forced upon him.

CONSTIPATION.—This is a condition which probably, not amounting to disease, yet prevailing to such an extent in all animals, doubtless favours the existence or commencement of such. It, therefore, demands our consideration. In the horse tribe, no matter to what kind of work he is put, we find some animals which are subject to costiveness, and others of an opposite character. When such symptoms as loss of appetite, with difficulty in evacuating the intestines, becomes apparent—particularly if signs of abdominal pain are also present, it is high time to render assistance in order to ward off the resulting condition which will be more or less troublesome, if not fatal.

Treatment.—Moderate exercise, change of food to that of a laxative nature, which should be regularly supplied. This should consist of green plants, as clover, rye, or vetches; or in their absence, turnips, carrots, bran, &c. A mild laxative may be given with enemata of tepid water if required. To prevent obstinate constipation is to prevent disease, and the main secret is to observe a regular system of diet and exercise.

In foals, constipation often becomes dangerous shortly after birth, from the accumulation and hardening of excrement within the bowels prior to birth. The symptoms are those of urgent colic, and need treatment of a similar character, such as enemas of tepid water, and medicine of a laxative nature; probably one of the best draughts is tincture of rhubarb, one or two ounces, in tepid water.

JAUNDICE occurs occasionally as an idiopathic affection, and therefore, merits a place under the class of diseases of the digestive organs. The causes are those which, being long continued, produce derangement of the stomach, intestines, &c.; such as bad food, ill treatment, and irregular habits, the effects of which, a predisposing state of body, concentrates in the liver.

The *Symptoms* are capricious, or absent appetite, with a slimy tongue. The evacuations are hard, dry, and coated with mucous, and the urine, if examined, contains the principles of biliary matter. The skin is dull and unthrifty-looking, swellings take place in the extremities and abdomen, if relief is not obtained, and the temperature of the whole body becomes very low indeed. Sometimes these cases prove very obstinate, the symptoms continue, and the animal at length dies.

P. M. Appearances.—Gall ducts are callous or indurated, gall stones may be present. Sometimes obstructions are found in the hepatic veins, as lymph deposits from previous inflammation of those vessels; at other times enlargement of the whole, or part of the gland occurs, or abscesses form. Hydatids may be discovered.

Treatment.—Use saline purgatives, as Epsom or Glauber salts, to establish a proper action of the bowels, and afterwards administer from 10 to 30 grains of calomel. Nitre, or the sulphates of potash and soda, are probably the best medicines, in one to three or four ounces each day. Aloes may be used as a purgative instead of the salines at first, if preferred, and a stimulant of cantharidine ointment or mustard applied externally. Enemas should not be forgotten, nor linseed tea as a drink omitted.

Preventive treatment will be found to consist in the use of good food. Adopting a regular system and time for feeding, with work apportioned to each animal of a character which can be accomplished without exhausting him. A fair share of work conduces towards health, but an unnecessary amount, with long fasts, are the prolific sources of disease, even when the food is unquestionable in quality.

COLIC.—This disease is known in two forms. One arises from flatulence, and the other from impaction—both, however, are spasmodic in their nature, and modifications of the same causes produces both. If there be one class of diseases to which the farm-horse is subject, and productive of greater loss than another, it is that which results from the unscientific and unnatural system of feeding which is practised in various localities, added to which the resulting Colic suffers maltreatment by as many draughts whose names are legion, until the animal is either literally poisoned, or rupture of the stomach or intestimes takes place, which speedily seals his fate.

A glance at the Anatomy and Physiology of the various organs, &c., which minister to the process of digestion in the horse, will at once convince the attentive observer that every provision to ensure complete performance of the act of preparation, has been brought into requisition. Incisor or molar teeth to collect and grind down the natural food—grain and leguminous seeds. Saliva, pharyngeal, and other secretions, all of vital uses in the process and system at large, accompany it to the stomach, where it meets with a further solvent, the gastric juice. Next comes the biliary, pancreatic and intestinal secretions, any of which being impaired or absent constitutes disorder, if not actual disease. Yet we attempt to set aside nature's laws, as if they were useless, by substituting cooked food, with other artificial and unnatural mixtures. It may be safely admitted that nature has not rendered any portion of her work either superfluous or useless. Teeth, glands, and secretions, are special provisions for special purposes, which all the cooked food cannot supersede without bringing about those conditions which are either actual disease, conditions bordering upon, or directly leading to it. Every judge of horse-flesh avoids the animal with long legs, slack loins and herring carcass, as being *washy* in constitution, bad feeders, and prone to colic. But scarcely any one who pretends to the same amount of horse casuistry can be caused to see the difference between such a state as a result of natural conformation and the condition brought about by giving continued supplies of sloppy and indiscribable messes under the mistaken term of nutritious food. In a word, the horse is not made for such, and hence the preponderance of deaths where cooked food is exclusively used.

The continued presence of food of too fluid a nature induces spasm, by subverting or impairing the secretions of the organs of digestion. A certain amount of bulk is essential, which if not present, the results are as stated. Fluids also pass rapidly, and are liable when in too large quantities to cause irritation, thereby increasing the action of the bowels, causing much to pass away undigested, and involving a greater consumption of food.

The remarkable passage of fluids in the horse is well exemplified, even in cases where the stomach is moderately filled with food, when it will be found that large quantities of water have passed onwards to the large intestines, leaving the injesta within the first-named organ comparatively moist only. Colic or spasm results from overfeeding. No matter what kind of food is allowed, if the animal is kept too long fasting, or is naturally a gross feeder, colic will often result. The stomach of the horse is small compared with the size of the animal's body—digestive process extremely rapid in health, and consequently that small bag quickly requires food, which if only allowed at long intervals he eats greedily—the sense of hunger is most acute, and food is bolted unmasticated to appease the ravenous desire within. The functions of the stomach being already weakened, are overpowered by the sudden repletion, fermentation commences, gases are eliminated, distention occurs, and pain from spasm is set up. Sometimes paralysis of the muscular coat of the stomach takes place, and the end is probably that by the violent action of the sufferer, rupture of the organ, some portion of the intestinal canal, or diaphragm ensues, from which the animal dies. Cold water is believed to accelerate these conditions, but the theory has met with stout denial.

Amongst the varieties of food more particularly giving rise to colic are bean, pea, or barley straw, especially when given to animals for the first time, or when their properties are damaged by wet, or become musty and dirty, &c. Animals also having access to a heap of barley, wheat, or the open corn bin, will frequently suffer from colic.

A sudden change from one kind of food to another, as dry to green, and *vice versa*, are among the most prolific sources. But all the pernicious properties are accelerated, and in most cases attended with the states previously referred to, viz., irregular systems.

Some animals suffer severely from spasms after hard work and long abstinence, even before food of any kind has been allowed, and from the irregular mode of treatment contract disease of contiguous organs, as of the liver, spleen, &c., which has no other symptom probably than colic, and wasting or want of condition. Colic also accompanies other diseases, as influenza, being the result of impaired function, and most probably also of reflex nervous action.

Symptoms of Colic.—The pulse is seldom influenced in the early stages, or even throughout slight cases, and maintains its volume and regularity for some time. The animal occasionally looks round to the flank, and shortly leaves his food; slight twitchings of the muscles of the abdomen take place, he raises his hind legs, and appears uneasy; attempts are made to urinate, he scrapes alternately with both, or persistently with one of his fore feet. Up to this time there is no disturbance of the temperature, or apparently of the system generally; the mouth is cool and moist, but shortly becomes dry and parched, and the breath is probably offensive.

He now curls his tail, more frequently turns his head to the flank, and lies down probably after a few crouching turns round the box; the twitchings of the muscles increase, the breathing is slightly interfered with, and becomes shorter, even to forcible respirations; he rises frequently, turns, and lies down as before, and endeavours to roll over on his back, sometimes maintaining that position with the feet tightly pressed against the stall or wall, &c.

The bowels are irritable, and discharging excrement in small but oft repeated quantities, which afterwards give way to constipation and severe straining, preventing the retention of enemas. Profuse perspiration bedews the whole body, the pulse becomes accelerated, and if relief is not obtained symptoms are speedily aggravated, which, as they increase, are indicative of the presence or approach of those terminations already cited.

Treatment consists in administering such agents as will effect the removal of the offending cause, assisted by enemas of simple warm water, or having an admixture of salt, soap, oil, &c. Oil of turpentine, laudanum, &c., &c., form the chief ingredients of the many colic draughts, with endless multiplications of questionable efficacy, except for harm.

For the class of horse we are considering I have always found the greatest success from the use of five or six drams of Barbadoes Aloes, in solution with stimulants; and during some years' extensive practice have not had an adverse case, when the condition of the animal and other circumstances have been duly and accurately studied.

We are seldom called upon to bleed now-a-days, and in this disease warranted in abstaining from it. Successful terminations of colic will take place in from one to four or five hours. Adverse terminations are rupture, invagination, twisting, and strangulation, peritonitis, and coma, or sleepy staggers.

Symptoms of Rupture of the Stomach, Intestines, or Diaphragm are coldness of ears and extremities, sudden suppression of perspiration, the eyeballs protrude, pulse becomes quicker and smaller, and at length imperceptible; he ceases to roll, and stands immovable, with contracted neck, and nose drawn towards the chest. The respiration is short and catching, the flanks, tail, and thighs quiver and tremble; retching comes on, vomition may be effected or partially so, and the animal drops dead.

At other times he sits upon the haunches, or rises like a cow, frequently attempts to urinate, but ineffectually, or in small quantities, and highly coloured, looks round in anxiety, and moves in a circle, partial coma comes on, he staggers and falls in some awkward position, death ensuing, after violent retchings and vomition having taken place.

A *P.M. Examination* reveals the food distributed throughout the abdomen more or less in the event of rupture of the stomach or intestines, and in that of the diaphragm, a considerable quantity of the above viscera having passed through the opening within the chest. The lungs may be slightly congested, but lesions of those organs are seldom found.

Several cases of rupture of the stomach which have come under my notice, supervening upon colic, have exhibited such a state of contraction of the muscular coat, that but a very small portion has been visible. The real cause, however, is soon explained by the unusual thickness of that which is left. In death from ordinary colic, apart from the lesions just named, discolorations, if present, are not signs of inflammation, but blood changes of the parts as a result of perverted action of the organs.

All cases of the above description are accelerated and intensified by the presence of hernial strangulation, twisting or invagination of the intestines, states which in many cases are not detected except upon a post mortem examination.

These will form a subject for future consideration.

ENTERITIS, or INFLAMMATION OF THE BOWELS, is a disease by no means of such frequent occurrence; when, however, it does take place, causes may be looked for of unusual and extreme character, such as having swallowed articles of irritant properties.

Symptoms.—The distinguishing features of enteritis are the evidences of serious constitutional disturbance, which accompany and precede the attack—conditions which do not obtain in ordinary colic. The pulse is strong in the first stages, becoming small, hard, and frequent as the disease advances, until it is irregular and indistinct. The temperature of the body is variable, betokened by cold ears and legs, &c. In most cases intense thirst accompanies other symptoms; the appetite is absent, bowels are constipated, urine high coloured, deficient, and probably voided frequently; and the membranes of the eye and nose are highly coloured, conditions which form a sure guide to the state of affairs within. Violent abdominal pains are not necessarily present, but the intense suffering experienced by the creature is verified by haggard expression of countenance.

The abdomen is tense and hard, tucked up, and considerable pain is evinced by pressure on the parieties. As the pulse becomes more indistinct, listlessness comes on, he looks at his flanks, sighs frequently, lies down for a short time until power fails him from severe prostration, when he endeavours by vain convulsive movements and attempts to rise, until death closes the scene.

If poisonous ingredients have been taken or administered, we may expect to have violent pains, with diarrhœa and straining, and other symptoms which arise according to the nature of the poison present—states which call for special treatment, antidotes, &c.

Favourable cases of enteritis are signified by the cessation of pain, return of natural cheerfulness of countenance, regularity of pulse and bowels, the exuviæ being of usual colour and quantity, proper moisture of skin, desire for food, &c., &c., which may be looked for towards the third or fourth day, but in fatal cases, according to the severity of the attack, death may not take place under a week, while in others it will not exceed 24 hours.

P. M. Appearances.—The whole of the coats of the intestines are considerably thickened from the amount of exudation within their substance, and from their peculiarly dark colour, extending over a large extent of surface, form characteristic signs of the disease. The mucous coat, from its nature, favours this condition, but *all* are involved, the peritoneum being the first to show the nature of the disease, which extends to the stomach almost in every instance—in fact, diseases which attack the intestines in a violent manner invariably includes that organ, and *vice versa.*

In proportion as the disease has existed, complications must be looked for, such as congestion or consolidation of one or both lungs, together with pleuritic symptoms and sympathetic affections of the cerebral organs.

Other causes, as strangulated hernia, or invagination of the intestines (the former being a portion of intestine, which, having passed out of the abdomen through some unnatural opening, &c., become tightly closed within it, and the latter that condition in which one portion of the gut slides within itself telescope fashion) often cause fatal inflammation and gangrene; but there is a greater degree of violence attached to these cases, owing to the amount of spasm which accompanies them.

Treatment of Enteritis.—This must depend greatly upon the cause. Accumulations of food, which, by long retention, have caused constipation, to which have followed inflammation of the intestines, must be met by a dose of purgative medicine. To this must succeed *enemata* of soap, or oil, in tepid water, given every fifteen minutes or so, linseed tea allowed *ad libitum*, and counter irritants to the abdomen. Hot fomentations may be had recourse to, and, if possible, the Roman bath. The convalescent stage will require strict rules of regularity to be observed in feeding, both as to quantity and quality, with moderate exercise, easily digested food, vegetable tonics, and hay tea.

COMA, or INSENSIBILITY, and as it is also termed, SLEEPY or STOMACH STAGGERS, and IMMOBILITY of French Authors, is not an unfrequent result of an overloaded stomach.

Causes.—Over repletion or impaction of the stomach, by food usually of a different kind to that on which the animal has subsisted of late, as for instance, new hay, wheat, or barley. Gastric derangement occurs in the horse readily by such food; and is most common on farms, where, by the neglect of persons in attendance, the animal gains access to the wheat or barley on the barn floor, or to the oats in the bin which has been left open. Impairment of the nervous functions results in a sympathetic derangement of the brain, by which congestion is ensured.

Symptoms.—It not unfrequently happens that animals under the same management become simultaneously affected when the cause is so apparent that there is no difficulty in pronouncing upon the nature of the case. It is highly necessary, however, to ascertain the full history, in order to arrive at some data as to the real nature and severity which it may attain; if possible, the kind of food and quantity consumed.

Constipation is always present, with abdominal pain at intervals, a full and bounding pulse, which speedily becomes slow or tardy, and as the disease advances, small and indistinct, urine suspended, partial sweats, tremors, countenance very expressive of oppression and anxiety—sometimes eructation or belching is observed, the eyelids droop, blindness coming on, in fact, the eyeball may be touched with impunity by the finger in many cases very early, the lips hang pendulous, the jaw resting on the manger, and perhaps body leaning against the stall, or standing posts, with legs wide apart, or probably see-sawing from side to side. The animal is listless, the back bone appears as if incapable of being moved out of a straight line, breathing slow, laboured, and extended, often accompanied with a loud noise—called stertorous—and a moan; the head is held low, if not resting on anything; delirium comes on, and the animal drops, sometimes absolutely dead, and at others, endures a most agonising fit of convulsions previously to the termination of life.

Animals which recover from such extreme states are sometimes affected with blindness from amaurosis or paralysis of the nerve of the eye.

The acute symptoms of impaction of the stomach resulting in rupture are given under the head of Colic. At other times we have *not* the urgency of the symptoms as first described. The action is loose, straggling and slovenly. A slight push will almost suffice to throw the animal to the ground. In addition to these appearances, we have constipated bowels, diminished secretion of urine, and yellowish membranes. At this stage good may result from judicious treatment, but if on the contrary, medicines are poured down the animal's throat without due regard to the nature of the ailment and action of remedies, we find the breathing becomes accelerated, pulse increase in frequency, and diminish in strength, general weakness rapidly comes on, and insensibility follows, during which the animal dies.

Treatment.—A brisk dose of purgative medicine, with incessant injections. If the animal will drink, add common salt to the water, or otherwise, add half a handful to a pint of tepid water, and horn it down about an hour after the purgative dose has been administered.

Remove all aliment, as nothing tends more to sicken an animal than the sight of food during nausea and the loss of appetite. During symptoms of violence, arising from cerebral excitement or pain, cold cloths should be applied to the head, or blisters applied to the top and sides of the neck. Great advantage would be derived from the application of ice to the withers and bottom of the neck. Put on plenty of warm clothing, and if the animal cannot rise, cover him also with plenty of straw.

If paralysis threatens, apply mustard to the loins, persevere in enemas, and expedite the action of purgative medicines as much as possible by the administration of fluids.

In cases where the urgency of symptoms, are overcome and recovery apparent, give one ounce of the tincture of gentian, three or four times a day, with two drams of powdered ginger.

There is yet another disease which arises from the neglect of proper regulations in the management of horses, viz., CALCULI. Keep your horses indefinite periods of time without food; impair the digestive organs also by an additional cause—too long continued work; supply inferior food and water, and the animal will snap at anything he can to appease the craving hunger he endures. It is thus he meets with foreign bodies, such as bits of stones, wood, nails, &c., &c., these, when swallowed, are surrounded by deposits thrown down from secretions, which in health would hold them soluble, and the result is the commencement of a stone or calculus, which may, possibly, pass from the body, while yet of an insignificant bulk; but there is a probability that some day or other death will result from increased size and presence. Any influence which brings about an impairment of the digestive organs, is likely, when long continued, to give rise to the formation of calculi, particlarly when the subject has a ravenous appetite—*bulimia*—and is induced to take in such foreign substances to appease his hunger. Millers' horses suffer from calculi, partly from the sand and grit supplied in the sweepings from the floors of the mill, and the long hours of fast they often undergo.

The *symptoms* of calculi are those of aggravated colic. Their presence may be suspected, but not always ensured by the symptoms presented, a post mortem examination being required to decide the state of the case. Even were it possible always to decide accurately upon their presence, their removal or solution would be an impossibility. When small, however, sometimes they are voided *per rectum*, and I have seen them taken from the large intestines varying from five to fifteen pounds weight. Doubtless, during abnormal conditions of the stomach, water impregnated with the earthy salts, minister much to the formation of calculi. This I think certain, as I have proved that animals taking the same food and water, having regular work, suffer from nothing of the kind, and attain a very great age, while others not experiencing such a systematic course soon come to an untimely end.

LAMINITIS.—One of the most common, and almost certain terminations of acute impaction of the stomach, particularly when that state has been produced from eating wheat, or barley, is Laminitis, or inflammation of the laminæ, or sensitive and vascular structures within the hoof.

The causes are to be looked for in the great sympathy which exists between, and the similarity to the structures involved, during that affection of the digestive organs.

Symptoms.—Great lameness and halting; the hind legs support the greatest weight of the body, and are brought considerably in advance under it to relieve the fore. When caused to move, the animal appears in one piece, the fore feet placed much in advance, so as to secure the heels of the fore feet coming first to the ground. The pulse is quickened full and strong, and the arteries at the fetlocks throb violently. All other symptoms of colic, pain, coma, &c., now give way, and the countenance is expressive of pain and suffering. The breathing is laboured and catching, bowels costive—but sometimes diarrhœa comes on and relieves the feet, but superpurgation is to be dreaded. The urine is deficient, highly coloured, and appetite gone.

Treatment.—Administer during constipation, a doze of aloes—five or six drams—and supplement their use by enemas and tepid water, horned down the throat at intervals; place the feet in warm poultices, and keep the body warm. In one hour after the aloes have been given, use ten drops of the tincture of aconite, every two or three hours, until the pulse is reduced; and if weakness results, add spirits of ammonia, half an ounce, to the aconite, to be given in cold water.

In such cases I seldom bleed, nor pare the feet, but were I called upon to abstract blood, would prefer the jugular vein for obvious reasons. As a rule, however, I must say that a majority of cases treated, do not warrant my doing either.

The terminations in cases seen late are pumiced soles or convex feet, with extreme lameness, which are the effects of altered structures within. These may be considerably mitigated by proper shoeing, but never cured.

Laminitis arises sometimes from concussion on hard roads in feet subjected to too much paring, particularly after the animal being heated is afterwards allowed to stand, or taken through a pond in cold weather. There is a predisposition, by actual disease already existing in the parts, needing only an exciting cause, which unnatural heating on the road and sudden changes amount to, in all potency.

Laminitis may, in a measure, be prevented, by avoiding the causes of colic and impaction of the stomach, and using the animal properly. The disease is also liable to ensue from pneumonia, or inflammation of the lungs, another disease which, to a great extent, may be avoided, by systematic treatment and arrangement of the details of stable management and work.

Broken Wind.—A disease of ravenous feeders, and idle horses, accelerated by undue exercise, after full meals, and an unsystematic mode of stable management, particularly feeding. It is undoubtedly hereditary, not, however, by transmission of the disease direct from parent to offspring, but conformation and states which in themselves favour the development of abnormal conditions and unsoundness. This is fully exemplified in the fact that animals descended from parents affected with broken wind, are affected themselves at an early age, providing the natural habits which are handed down, have their full scope for gradual development and exercise. I have seen the disease in several animals on the same farm, clearly traceable to hereditary origin, either on the part of some much valued, but worthless, old mare, or by the frequent use of an entire horse, whose progenitors or himself were subjects of the affection.

Nature.—Those animals which are prone to take on this affection are great eaters, greedy animals, with large capacity, to whom nothing comes amiss at any time. The first effect is probably an abnormal increase in the size of the stomach, or by long fasts and irregular feeding, a ravenous desire for food is engendered—called *bulimia*—and often the cravings are satisfied in strange ways, and by peculiar kinds of ingesta.

Succeeding such states, the constant weight of matter in the digestive organs exercises a pernicious influence on the abdominal muscles. Motion also accelerates the alteration of muscular fibre, and the end is they are unable to maintain their proper action. As the abdominal muscles are agents in respiration, it is not surprising that a modified action should take place when they are deranged; others are called in to supplement their action, and we have a double lift in breathing.

Flatulence caused by continued indigestion, arising from functions interfered with, and emphysematous states of the lungs found after death, are, together with a paralysis of the nerves, going to the muscles of the windpipe, merely symptoms of the great disarrangement of the abdominal region; the whole cause of which exists in an unsystematic mode of breeding, rearing, managing, and feeding farm horses.

Turn to the stables of the trainer and see his system. Scrupulously exact, the exercise, grooming, feeding, watering, &c., are, in the language of the epicure, "done to a turn," all are executed by rule and to the minute. Nothing mars the work of the trainer so much as one who is heedless of "a system," which with him is *the* system. And he has no broken-winded animals, few or no chronic coughs, no colic, no laminitis. But remove the thorough-bred to the farmer's stable, and a thousand to one, he is made to suffer them all.

Treatment.—Recent cases of broken wind are curable. The method is this—Avoid heavy feeding, of no matter what kind—particularly cooked food. Establish systematic modes of feeding, such as regular times. No horse should fast more than four hours at the most—give good food in a digestible form, and do not allow greedy feeders food and water *ad libitum,* particularly before work; if no other method can be adopted to secure this, as the beast will continue to devour his bedding, put on a muzzle as soon as a proper quantity has been consumed. Such animals should never be allowed to eat their fill, but the stomach must be satisfied with bulk, containing nutritious food, as oats, beans, or peas, in mixture, according to the work. If the ravenous feeding has been induced by irregularity, the disposition will be overcome by the treatment here prescribed in a short time, when extreme regularity must be afterwards enjoined, both as regards work and times of feeding. Confirmed cases of broken wind are dependent upon states or lesions of tissues, which are irrecoverable.

Its prevention is mostly certain in stables where the real welfare and condition of the horse is considered.

GASTRITIS.—Gastritis, or inflammation of the stomach, now and then occurs as an independent malady, having its cause from the introduction of irritants within the organ, as poisons.

Mostly it arises in conjunction with inflammation of other organs as the bowels, &c., &c., with which it is in direct communication. As an idiopathic affection it is usually induced by the absurd meddling of the attendant who presumes to the mystic art of getting his horse into prime condition; for this purpose savin, arsenic, calomel, and tartar emetic, &c, &c., are used. Not long ago, in Yorkshire, a horse was poisoned by savin administered by the man who used the horse, and in the county of Oxford five or six farm horses were poisoned by arsenic foolishly given to the animals.

Symptoms.—There is great uneasiness, the animal crouches and lies frequently, turning his head round to the flank. There is nausea, sometimes retching, comes on, and the pulse, although strong at first, becomes quick and weak, irregular and indistinct. Insatiable thirst occurs, and violent straining, with purging, mostly ensues. Temperature of the body becomes unequal and irregular, while patches of perspiration break out variously over the body. The eyes are protruded, pupils dilated, and stupour or unconsciousness shortly sets in; urine high coloured and deficient; abdominal pain most intense, the animal either becoming paralytic or dying in agonising convulsions.

The post mortem appearances are the only means of verifying the true nature of the malady. There is an exudation present between the coats of the stomach, causing that organ to be of much greater thickness than ordinarily; the ramifications of blood vessels are distinctly reddened and delineated throughout their course and distribution, being filled with blood; spots or patches called ecchymosis are present, and erosions, or removal of the membrane, are present in places. Usually also traces of the poison, if it be of a metallic nature, which has caused the mischief, will be found on the internal coats adhering to it in places.

It would be impossible here to enter into the minutiæ of treatment required in cases of gastritis, occasioned by irritant poisons; for dependent upon the drug which had been administered must be the choice of certain agents or antidotes selected. Much obviously depends upon this, and if, in the history of the case, information relative thereto is withheld, or otherwise not forthcoming, direct measures cannot be fully carried out. In carnivora benefit can be obtained which is impossible in the horse, by the natural act of vomition; in the latter, articles of a pernicious character remain in contact with tissues, carrying on their work of destruction, while the poor creature suffers most excruciating pain, unable to clear the stomach, and frequently dying before medical aid can be obtained.

Treatment must always be dependent on the following provisions:—

The causes of gastritis must be clearly ascertained before measures can be properly directed, and before the poison can be eliminated from the system, either by expulsion or neutralization by antidotes. Bleeding may often be attended with great danger in cases of gastritis occasioned by the effects of poison and ordinary remedies, as adjuncts to their pernicious effects. It is clearly therefore a matter of extreme difficulty to direct in these cases, except in special terms, which is impossible in the short space before me, and the limited use to which they could be put by non-professional persons.

The various agents which produce the affection we are considering are cantharides, oil of tar, turpentine, &c., some of the ranunculacæ, the darnel grass, &c., aloes, creosote, savin, bichloride of mercury, calomel, arsenic, and salts of iron, copper, &c., &c. Of the acids, sulphuric, nitric, hydrochloric, and oxalic, with the caustic salts of ammonia, potash, soda, &c., &c.

Vegetable irritants may be frustrated by the use of purgatives, opium, &c.; calomel, by opium; bichloride of mercury, by white of egg in large doses; arsenic, by the red oxide of iron; sulphuric and mineral acids generally, by carbonate of baryta, soda, or magnesia in barley water, or linseed tea; sulphates of iron or copper, the alkaline carbonates or magnesia; oxalic acid, the carbonate of magnesia, or lime, chalk, &c., &c.

Mostly, however, when such cases occur, they are unexpected and unprovided for; the proprietor is ignorant of the measures which are required, and veterinary skill not readily available. Under such circumstances, therefore, with the acknowledged symptoms of gastritis before him, such remedies as linseed tea or thick barley water, with eggs beat up in it, will be the best to administer until proper aid can be obtained; which, however, may be quite powerless in the absence of correct information as to the history of the case.

I have known the branches of yew partaken of by horses productive of irritant effects, which, however, an active purgative, followed by stimulants, has prevented from doing bodily mischief. Mouldy bread has also been equally pernicious, but yielded to similar treatment.

The great evils in cases of poisoning in the horse is the secrecy which is observed by attendants to avoid censure for carelessness, or punishment for wilful administration. In the absence of information much good cannot be expected from medical treatment.

Gastritis from implication with other organs, as with enteritis, must be treated as directed under that disease.

PARASITES OF THE STOMACH.—Of these there are several occasionally found, but the one only which concerns us at present is the œstris equi, or horse bot.

The female fly deposits her eggs in summer, together with a glutinous matter, which serves as a medium of strong attachment, upon the arms and breast, which, by causing irritation, induces the horse to gnaw and bite the parts, and by this means are carried by the tongue towards the stomach, where they are shortly hatched, and found adhering to the cuticular membrane, by their peculiarly wonderful hooks. A lengthened description of this interesting creature and its habits cannot be entered into here. I shall confine myself to results.

The larvæ of the bot remains within the stomach all winter, and are only detached during the genial weather of the following spring or summer. It is now covered by a shell, and is known by the name of chrysalis, which, about the nineteenth or twentieth day, bursts its covering and escapes fully formed, active, and powerful on wings, and legs covered with down, at an early hour in the morning, varying with the time the sun rises, from three to five, A.M., and capable of taking active part in propagating its species at once.

Horses suffer from the effects of these parasites. I have witnessed instances where their presence in considerable numbers adhering to the stomach, has produced continued symptoms of indigestion, swelling of the legs, unthriftiness, inaptitude for work, impairment of appetite, and other functions, and in more than one case I had no doubt in ascribing the cause of death to their presence, all the symptoms of gastritis having been set up—of a chronic form—with abrasion of the mucous membrane.

No known medicine will remove the larvæ from the horse's stomach—at least injury to the animal will ensue before their removal is at all apparent. The only remedy for them is prevention by not feeding horses on the pastures where evil consequences are known to result from them.

INTESTINAL WORMS.—Intestinal parasites are frequently troublesome to the farm horse, giving rise to symptoms of indigestion, unthriftiness, dullness, and even colic. The assimilation of food is interfered with, the animal is hidebound, skin dull and scurfy, and bowels irregular. To allow this state to proceed, is to lay the foundation of a series of disorders.

Treatment.—Administer a brisk dose of purgative medicine, which may be all that is required. Some practitioners give linseed oil and turpentine, others tartar emetic or a calomel purge, all of which, with care, are efficient remedies. Half an ounce of iron filings administered every morning in a ball for 10 or 12 days, and followed by a dose of purgative medicine, commonly effects a cure. Enemas of turpentine are useful for thread worms. The various worms found are the lumbrices, or long round worm, chiefly inhabiting the small intestines but found often in all parts of the canal, and frequently voided with the excrement; and the ascaris vermicularis, or thread worm of the rectum, a violently irritating parasite. The causes being those which induce an unthrifty state of the body generally, preventive treatment will consist in adhering to good food and systematic management. Tonics, as the sulphate of iron, will be needed after the bowels have been evacuated.

VOLVULUS OR ILIUS, INVAGINATION OR INTUSSUSCEPTION, STRANGULATION BY TUMOURS, HERNIA, &c., &c.—There are various conditions recognised by the above titles to which farm horses occasionally fall victims, the *modus operandi* of which, however, are similar in their character. Their diagnosis is not always certain during life, as symptoms resemble each other in each case as much in likeness as in intensity. Usually the real state of things is only developed on a P.M. examination. *The Symptoms* are those of severe colic, protracted and intense; the pulse becomes quick at the commencement, and continues to become more rapid, and after the crisis weak and imperceptible; the agony is unmitigated, and death takes place from 12 to 48 hours, or even extending to the third day. *Volvulus* or *Ilius* consists in an entanglement of one or other of the portions of intestines, occurring by rupture of the mesentery or caul, and the passage of the gut over a band of the same becomes strangulated, or in other words, circulation is stopped, and mortification ensues. The colon has been known to turn over on its short axis when the same effects occur. These states are brought about by colic, during which the animal rolls—the weight of the replete organs giving rise to the lesions referred to. Volvulus is therefore incurable.

Invagination or *Intussusception* is the passage of one portion of intestine within another. Here also we have more or less rupture of the mesentery, or strangulation of the intestines, both the large and small being subject to it.

Hernia is the passage of a portion of the intestinal tube into a sac or unnatural cavity without the abdominal space. It is usually a result of accident, and animals thus affected are said to be *broken bodied.* The parts in which this state occurs are the scrotum or purse, or only within the inguinal canal in the groin. Here it is owing to an imperfect closure of this opening within the abdomen which gives exit to the testicle at an early age. It takes the name of Exomphalus when the state is present at the navel, and simply Hernia when the rupture of the abdominal walls in any portion gives rise to an intestinal tumour within the skin. Other hernial states are known, as the diaphragmatic, which, as stated under rupture of the diaphragm, admits of the passage of the abdominal viscera within the chest. There are omental hernias, in which the omentum protrudes, but these are not of a fatal character usually, besides others which do not concern us much now.

Hernia may become strangulated, and the symptoms mistaken for colic; this is more common than has been thought, particularly among geldings. The passage of the intestines into the canal within the groin, or other abnormal cavity, is sometimes attended with stercoral matters, which, by the position at the time, are favoured in their entry, but exit is impossible. As soon, therefore, as the tube is filled, pressure commences, and then follows the whole train of symptoms of extreme colic. If the abnormal state is not detected, death results after much suffering.

Special symptoms are due to these cases of volvulus, intussusception, and hernia, as severe straining and rapid expulsion of enemas—sighing, and even vomition, or violent retchings, with severe colicky pains.

Beyond the careful attention to diet and regimen, exercise, &c., but little can be done to prevent the occurrence of the states just mentioned; when they occur after such precautionary measures, some accident or abnormal condition which has been brought about is the sole cause. There is also no cure after they occur, except in the case of early detected hernia, when the animal needs to be cast, and the gut returned, for which a veterinary surgeon of skilled pretensions is only capable.

PERITONITIS.—This disease is commonly known as inflammation of the peritoneum, the membrane which covers all the organs within the abdomen, and lines the walls of that cavity.

Causes.—Wounds either accidentally produced, or in some cases when interfered with in surgical operations. That of castration often causes death by producing peritonitis, which continues from two to five days. The peritoneum may be affected idiopathically, in the acute and chronic form, and usually is involved in the disease of those organs which are covered by it. It may form, however, an independent affection.

Symptoms.—Absence of appetite, with thirst sometimes the most intense. The pulse is accelerated, wiry, and hard; tremors may affect the whole body, but are usually confined to the hind extremities; the nostrils are dilated; countenance anxious, respiration laboured, and action confined principally to the chest; colicky pains are present; the horse paws and scrapes with his fore feet, looks round to the flank, and crouches; costiveness is present, and the urine scanty and highly coloured. The animal at length loses strength, the pulse becomes imperceptible, he lies down about the third day, usually on one side, and dies after 24 hours or so. After death is found effusion of lymph between the folds of peritoneum and intestines, forming what are termed *false membranes*, and which not uncommonly have caused adhesion; sometimes effusion of water is present to some extent.

Treatment.—Nitre should be given in the water the animal drinks, and hot fomentations to the abdomen persisted in for hours, as well as enemas of tepid water. Purgatives to relieve the bowels with other remedies, as aconite, calomel, opium, &c. Bleeding is not calculated to be of service in these cases.

DIARRHŒA is to be looked at more as a symptom of disease than of being disease itself, consisting of continued evacuation of liquid fæces, without much pain or hemorrhage. It usually ushers in diseases of a catarrhal nature, or those affecting the mucous membranes, in which class that which lines the intestines is included, arising from derangement of that system of tissues. It also arises from the presence of some irritant matter, not itself a poison, within the intestines; another form is that which attends actual disease, as blood poisons, &c., and is found in conjunction with organic changes in the structures of the liver, spleen, pancreas, kidneys, lungs, &c., &c. The horse is prone to diarrhœa that is compelled to endure privations, as deficient and inferior food, bad water, and inadequate shelter, over-work, &c., all of which are predisposing causes, and effectual agents also in producing permanent disease of other organs in conjunction.

Symptoms.—Frequent fluid evacuations and discharge of flatus, occasional colic, uneasiness of the hind legs, straining, and loss of appetite. The animal rapidly wastes and becomes emaciated, and dies from extreme weakness. After death the appearances will be found to vary as the causes are present, and will form a part of consideration under other heads. In simple diarrhœa, however, we seldom find more than those signs of determination of blood to the parts, as indicated by the redness usual to, and dependent upon, active secretion.

Treatment.—Simple diarrhœa may be removed by half the usual dose of castor oil and laudanum—viz., half-pint of the former and one ounce fluid measure of the latter. Warm water injections are also useful. Keep the animal warm, allow good food, thick gruel at first, or boiled corn, clean beds, and perfect ventilation. Small quantities of fluid, however, must only be used. Should the purgative not succeed in removing the irritation after a second dose, in all probability, opiates, astringents, &c., as catechu, tannic or gallic acid, kino, &c., will be called for with starch gruel.

The following forms are most useful:—

No. 1.	
Powdered gentian......	8 drams.
Tannic acid............	½ dram, or
Powdered galls.........	2 drams.
Starch.................	1 ounce.

Given in tepid water, twice a

No. 2.	
Prepared chalk.........	1 ounce.
Catechu, or kino........	2 drams.
Gentian powdered......	4 ,,
Opium	

In ale or gruel, twice or three times a day.

No. 3.

Sulphuric acid.... ....1 dram.
Powdered gentian.........2 to 4 do.
Water...................6 ounces.
To be given three or four times daily.

Preventive measures are those advocated for colic, &c. A course of chalybeates should follow recovery—say 2 drams sulphate of iron, twice daily.

DYSENTERY is an aggravated form of diarrhœa, attended with inflammation of the mucous membrane of the intestines, mostly the large, and accompanied with ulceration and bleeding, hence the name of *bloody flux.* The causes are those which have been enumerated under diarrhœa, long continued. Two forms are observed, the acute and chronic. While the acute depends upon those conditions in which the blood is at fault, the chronic will arise from or out of those which produce simple diarrhœa, if persistent. Horses taken up from low marshy soils contract the disease, which proves very frequently intractable. I have seen it in several instances where animals who, having been left in the low lying meadows, and surrounded by floods for some days, or even a week or two, have been driven to the highest ground, where but scanty food existed for them. Many of such cases terminated fatally.

Symptoms.—In addition to the constant painful bloody and fluid discharges from the bowels, we have a weak, and often indistinct pulse, mouth moist, but hot and offensive, unequal temperature, rapid emaciation and accumulation of vermin in the skin, the hair is easily removed, colicky pains are present. the eyes are dull, and not unfrequently a discharge takes place from them. There is tendency towards gaseous distension within the bowels, and discharge of flatus with the fæces, and bubbles are seen floating in the excrement. In some localities, this disease is known by the name of *molten grease,* from the quantity of mucus which is passed from the bowels.

After death, which is protracted in the chronic variety, and varies from three or four days to as many weeks, we find a reddish discoloration of the mucous membranes of the bowels, with an œdematous state, not unlike jelly in appearance; the epithelium is easily removed, and in some instances there is lymph effused, a condition in which the whole of the alimentary canal more or less participates, with abrasions or ulcerations, which vary in extent and number, and, in some instances, absolutely perforating the intestines.

Treatment.—In acute cases, use emolient clysters and mild aperients; pay particular attention to principles of comfort and cleanliness, all of which are sure aids towards effecting a cure. Administer half a dram of opium and calomel three times a day for two or three days, or in their place, if no relief has been derived, small doses of turpentine may be given, as half an ounce, three or four times a day, in flour and water, or starch and water. Sugar of lead, white vitriol, one or two drams, may be used, or the vegetable astringents, as catechu, kino, &c., &c., as directed for diarrhœa. Opium and alkalies, as potash or carbonate of soda, have proved beneficial, as the following :—

Take of Carbonate of Potash or Soda............	2 to 4 Drams.
Sherry Wine..........................	A wine glass full.
Powdered Opium......................	Half Dram.

To be given with linseed tea or starch gruel, three or four times a day.

Where much fœtor exists, chlorinated lime may be given in doses of 2 drams, and the nose and eyes sponged with weak vinegar and water, Condy's disinfecting fluid, &c., &c. Chalk and opium also will be found useful—one ounce of the former to one half or one dram of the latter in gruel. In all cases care must be taken not to administer too much of any kind of medicine, as thereby greater evil will be produced than would be expected, in the absence of all good, and in cases of recovery, a judicious diet will be indispensable in promoting convalescence.

PROTRUSION OF THE RECTUM OR BOWEL, or *Prolapsus Ani*, in technical language, occurs in consequence of violent straining, particularly from obstinate constipation, diarrhœa, tympanitis, or when intestinal parasites are present, causing acute irritation; it also occurs during difficult parturition in the mare, and sometimes proves intermittent and intractable.

Treatment.—Whatever is the cause of inversion of the bowel, that must be removed, or at least mitigated, ere relief can be afforded by its safe return. If it be diarrhœa, opiates will be needed to overcome irritation, and in the case of pregnant mares, a larger dose will be required. The gut must be replaced as soon as possible, which will be done by the hand—fomentations, scarifications, or opiate lotions being applied, probably previously, if needed. Lead and opium injections may also be required after the intestine has been returned.

In case much swelling takes place in the protruded organ, or that difficulty occurs in causing it to retain its position when returned—the local application of ice may be needed, or a truss, bandage, &c. In severe cases, strangulation or mortification may take place, when amputation must be resorted to at an early stage, or the life of the animal may be cut short by a combination of causes.

WEED, or LYMPHANGITIS, although not so prevalent as formerly, nevertheless is often present among the horses of farmers in some localities. The animals most subject to this disease are the coarse legged, irregularly fed and worked animals which we see in some districts. It, however, does occur in some of the more highly fed animals as a result of a modified form of carelessness, and might in the majority of instances be avoided.

The causes are irregularities in work and food principally, a predisposition being found probably in the habit of body or conformation, and structure. Thus we find animals with thick legs, having an abundance of hair and cellular tissue beneath the skin, ravenous feeders, &c., are most prone to contract the disease.

Nature.—A sudden changing of the circulatory system, with an abundance of extra nutritive matter, by which the coats of the vessels of the hind extremities suffer most, by stretching under the heavy column of blood, causing exudation—into the surrounding space—of the watery portions, which act as an irritant on the parts, giving rise to heat, pain, tenderness, and considerable fever. Weed generally is seen on Sunday evenings or Monday mornings, and other days after the hard worked horse has received a day's rest and inactivity.

Symptoms.—An enormously swollen state of one of the hind legs, very seldom in both, accompanied with great lameness, corded state of the vein on the inside of the thigh, which is intolerable under pressure. The skin is tense and hot, and in places, particularly over the coronet and fetlocks, constricted by transverse bands which appear to dip into it and tie it firmly down to the bones beneath. The pulse is full, strong, and accelerated, but not much affected in the first stages, being slower than natural and soft. Upon enquiry, the animal has eaten up all his food, and probably has exhibited in the eye of the attendant greater signs of health previously, and his illness, therefore, proves to him the greater mystery.

Treatment.—If called in proper time, this is one of the few diseases in which I would abstract blood, probably to the extent of 6 or 8 quarts. Next administer a dose of aloes, keep up the use of enemas every 15 minutes, and envelope tumefied limb in broad (3 inches) flannel bandages from the foot to the greatest possible height; cover these with convolutions of soft hay or straw bands bound, not tightly, but affording *moderate* pressure, and use a constant stream of hot water, which should be poured from the top within the bandages, all round the limb.

Keep the animal short of food, and when the medicine has acted freely, two or three drams of nitrate of potash may be given in his water or put into a mash night and morning for three or four days. As soon as exercise can be borne let it be taken, or light work, if it can be honestly apportioned to the patient.

Weed is liable to recur after the first attack on all similar occasions, and with all the necessary causes existing. I have succeeded in banishing it altogether from the stables of farmers and others, by adopting a regular mode of feeding, work, and by preventing horses prone to it from having too long rest without exercise after work, has been excessive.

The sequelæ of recurrent weed is grease and farcy; conditions which are brought about by impairment of the constitution, and becoming hereditary from the irregularities and excesses referred to, exhibiting variable phases of disease and of dangerous tendencies to other horses.

GREASE is generally defined to be an inflammation of the sebacious glands at the back of the fetlocks and heels, on which parts numerous pustules form, which secrete a fetid discharge of purulent matter, and associated with a febrile condition of variable extent. At first it may be looked upon as a phlegmonous affection, afterwards spreading towards the hocks, being rarely present in the fore limbs; sometimes sufficiently severe to render the hocks rigid and stiff. Pustules form, which contain a yellow matter, and after bursting granulations sprout luxuriantly. These shortly afterwards are covered by an encrustation or scab, which is removed on the application of slight friction, exposing a white surface with numerous bleeding orifices. The surface is occupied with ulcers and enlarged papillæ, and the latter has the appearance of being arranged not unlike the clustering of grapes, from which similarity the term "grapy" has been applied.

The limb becomes enormously enlarged, and sometimes abscesses form in various parts of the leg from inflammation of the lymphatics, at other times farcy buds appear, or the frog and sole is involved, and constitutes the variety of disease termed canker. The causes are commonly found in low damp marshy soils, want of cleanliness, low bred horses, and particularly those with white heels are most subject to its attacks.

Treatment.—Early cases only are curable. Chronic cases are associated with constitutional taint. Use poultices freely, with dressings of chloride, or the sulphate of zinc, but care must be taken not to omit during their use laxatives and nitrate of potash, as described under weed, as fatal cases have been known to occur by arresting the secretion and discharge too rapidly. Sulphuric acid, half an ounce; sulphate of copper, one ounce, and water, one quart, will form an admirable lotion. Ointment of lead and zinc will also be found useful. Let the skin of the body be well cleaned every day, give moderate exercise, institute habits and practices of cleanliness, and in chronic cases use half an ounce of Fowler's solution of arsenic morning and night in the food for some weeks.

This disease is not so often seen as formerly, owing to the advancement of knowledge as regards the management of horses. Years ago, whole studs of cart horses were annually consigned to the knacker as incurable, either having become useless for further work, or that the loathsome appearance of the animal induced the owner to get rid of him in the most summary manner possible.

DISEASES OF THE SKIN, &C.

The meagre acquaintance which non-professional persons generally have of the diseases of the Equine tribe inevitably lead to confusion and a mixing up of dissimilar diseases.

With regard to skin diseases, this error is most patent, nearly, or I might safely say all, being included under the one convenient term *Mange*. I need not point out the result of this ignorance, further than as it is well known to foster empiricism and quackery. Such terms are also exceedingly convenient to grooms and farriers who undertake to cure diseases, as by the blindness of employers they are able to cure (?) complaints commonly known under the name of an inveterate disease, and which would, if let alone, with the adoption of perfect sanitary measures, get well without their interference. If, however, farmers will be ignorant, and not trouble themselves to understand their province, nor cease to patronise chicanery and humbug, by all means let them pay for it — for certain it is that nine-tenths which they expend under such circumstances, would pay for the advice and experience of three respectable Veterinary Surgeons, who, if properly entrusted, would not only effect a scientific and successful termination of the affection, but put him on the proper track towards avoiding similar diseases in future.

HERPES, or TETTER, is a vesicular disease of the horse, generally circumscribed, and accompanied rarely with symptoms of constitutional disturbance. These vesicles are sometimes so small as hardly to be distinctly recognised, particularly where the hair is strong and dense; at others they are as large as a millet seed or pea, and show the hairs sticking out of them, erect and incapable of being made to lie smoothly. Where the hair is thin, the disease is easily distinguished.

As there is much irritation of the parts, the animal rubs himself, the vesicles are burst, and scabs form, which entangle the hair, and eventually together are detached from the skin, leaving purple coloured, tender, and irritable sores, which occasionally take upon them the ulcerative action.

Such is the similarity in this affection to farcy and glanders, particularly as the parts affected at times are the lips, nose, face, Schneiderian membrane, inside the thighs and fore-arm. I have on several occasions had such cases recovered, which have been pronounced suspicious.

The treatment should consist of bran mashes, laxatives, exercise, with lotions of Goulard's extract. The causes being associated with a derangement of the digestive organs, its prevention is clearly to be looked for in the establishment of regularity and system in the feeding, housing, and working departments.

RINGWORM consists in patches of conglomerate vesicles which form in spaces varying from half-an-inch to one and a-half inches in diameter, over the whole surface of the body. Similar conditions are noticed in this disease, as in the one already mentioned, excepting that it is now acute, attended with considerable fever, irritation, hard and full pulse, reddened mucous membranes, hard fæces, and high coloured scanty urine; appetite diminished or absent altogether, the animal appears dull, and the countenance haggard. Slight irritation removes the scab and hair from the dried surfaces, which underneath are red and tumified. Ringworm is decidedly contagious.

The *Cause* is a plethoric state due to the mode of feeding pursued. The cure depends upon low diets, purging, administration of nitrate of potass, liquor arsenicalis, &c. The ringworm may be touched with a weak solution of nitrate of silver, nitric acid, &c., &c., all other adjuncts, as cleanliness, &c., being fully enjoined.

Preventive treatment consists in avoiding excesses of diet, with regular exercise, airy stables, cleanliness in every respect; the body brush properly used, being itself a great agent in promoting the functions of the skin.

PURPURA HÆMORRHAGICA, although affecting the skin, is nevertheless a disease depending upon a certain condition of the blood which favours passive hæmorrhage, or in other words, the possibility of the constituents of the blood being allowed to transude through the walls of the circulating vessels. Several kinds or varieties are described by authors, but here one description will suffice for general purposes.

The symptoms are irregular patches of effusion over the body —particularly under those portions where the skin is thinnest— which continue to increase sometimes gradually, and at others suddenly. Spots, called petichiœ, are seen on the schneiderian membrane, or membrane of the nostrils; nose and lips, together with the eyelids, neck, breast, abdomen, and legs, swell, rendering movements oppressive and difficult; the conjunctival membrane (of the eye) is also spotted; the pulse is wiry, and hard, and strong, and appetite lost, partial sweats come on, and blood exudes over the surface of the body in large and frequent drops.

By degrees the swellings merge into each other, and increase from the continued deposition beneath the skin, consisting of blood and lymph; discharges of a sero-sanguineous nature take place from nose and eyes, the margin of the latter being swollen; the respiration is interfered with from the effusion, and the affected membranes become black; the pulse becomes more frequent, feeble, and less distinct; debility rapidly supervenes, the animal totters and reels as he walks, and if he lives sufficiently long becomes loathsome from the formation of ulcers in various affected parts.

The *causes* are to be found in those influences which produce debility, as other irritating and lowering diseases; inferior living and inattention. These are the most common, but cases arise when causes are not quite so recognizable, their history being of a doubtful character and unreliable.

Purpura Hæmorrhagica is attended with fatal results in many instances. We, therefore, can only pronounce favourably on the issue of the case when fever abates, swellings are decreasing or confined to the lower extremities, motion not particularly interfered with, secretions and excretions resuming a natural tendency of action, &c., &c. But if, on the contrary, the opposite state of things go on and there are evidences of internal organs becoming affected, the issue will be very doubtful indeed.

Treatment.—Absolute purgation cannot be withstood. Mild laxatives will answer if not too extensively used. Bleeding is resorted to by many practitioners, with, however, questionable benefit. Turpentine and the mineral acids are valuable medicines, the former in one ounce doses in gruel, three times a day; but as it is likely to produce a discharge of blood by the urinary organs, its use must be cautious and limited; and the latter in dram doses given three times a day in cold water or gruel.

Preventive measures consist of avoiding those means whereby a state of plethora is produced, particularly in young horses, for the purpose of making up for fairs, &c., by this the system becomes suddenly charged with material, which in the end produces a morbid condition of the blood, as well as avoiding other diseases.

Mange is an irritative state of the skin, local in its nature, and dependent upon the ravages of an insect which causes itchiness, ulceration, and suppuration, followed by an encrustation or scabbing over the affected parts.

It is highly contagious, owing to the passage of the insect or its eggs, and their development on the surface of the body of another individual. The parts affected are the sides of the neck, under the mane, on the shoulder beneath the collar, and along the back under the harness.

The difference between the two forms of herpes already described and mange is this—that mange continues to spread over the surface, commencing from a central point, while herpes commence in patches, one form of which has the tendency to become confluent, though rarely does so.

Treatment.—Sulphur, two ounces; train oil, one pint; spirits of tar, an ounce, mix and rub each morning, and wash off the fourth day with soft soap and warm water. All woodwork in stables where affected animals have been kept, should be well washed with a strong solution of potash ley and turpentine; stone and brick work whitewashed, and clothing scoured in hot water with a strong potash or soda solution.

MALLENDERS AND SALLENDERS are names synonymously used for the same disease, affecting the bend in front of the hock and behind the knee. It consists in irritation of the skin set up by want of cleanliness, or during a prevalence of wet weather; this is succeeded by tumefaction, and at length by suppuration, the pustules taking the form of lines across the limb, owing to the action of the same.

Treatment.—Cooling lotions and medicines, avoid dirt, and when heat and tenderness is abated use iodine ointment.

Prevention of mange and mallanders, &c., avoid contagion in the former, and do not allow dirt to accumulate on the legs for the latter. Adopt cleanly habits, and promote health by ventilation and comfort, with good food.

BLOOD DISEASES.

STRANGLES is a disease peculiar to horses, and mostly occurs during youth. It is considered by some veterinarians, and not without reason, to be a scrofulous disease. It mostly follows domestication of the animal; and, although some horses never suffer from it, its occurrence in others cannot be prevented.

Symptoms.—A period of dullness usually precedes the attack, which is variable, however. The appetite is capricious, the coat begins to stare, flanks tucked up, sore throat comes on, and swellings appear underneath the jaws.

A cough is present, the possibility of swallowing at length is precluded by the tumefaction, pulse increased, saliva drivels from the mouth when the lips are separated, and a yellow, purulent discharge eventually issues from the nostrils. The increase in size of the inflamed and hard tumours proceeds apace, and in from eight to ten days begin to feel soft in the centre, a sense of fluctuation or movement of fluid beneath is evident under the finger, and in a few hours matter or pus is evacuated. This is not, however, the usual course which the disease pursues.

The seat of the formation of matter is sometimes located in the parotid glands, and deep seated; at others we have severe sore throat and catarrh preceding the attack, and in not a few the tumours, after occupying a protracted period without increase in their size, or having any tendency to suppurate, they disappear altogether, or leave small, round, hard nodules in their place.

Tardy forming tumours in strangles is a variety of the disease to be dreaded, as possibly abscesses may form in the chest, abdomen, or in the groin, front of the shoulders, and, in the two former conditions, always productive of death.

Treatment.—Encourage the maturation of all abscesses, and have them opened as soon as possible, after which protect them from cold by having the patient placed in a cool loose box, which is well ventilated and sheltered from cold winds. Make use of warm clothing, give hay or linseed tea, and offer food of the most nutritious and digestible character, as malt mashes, boiled oats, grass, clover (green), swedes, carrots, or parsnips. Steam the nostrils by means of a nose-bag, with hay chaff or sawdust at the bottom, on which boiling water has been poured. Hasten the abscess by the use of a hood, or apply a square of flannel, three or four thicknesses, to the under side of the jaw, which, promoting warmth, has a beneficial effect. *Spongio-piliine*, dry, has been used in my practice with great success for this purpose, and has very beneficially superseded blisters, which would irritate far more than do absolute good in weak and exhausted cases. Poultices to the abscesses are useless; they cannot be closely approximated; hang from the parts, and allow cold to enter; besides this, there is a difficulty in maintaining an equal temperature.

Stimulants will be needed in some debilitated and tardy cases. For this purpose, ale and brandy, nitric ether, and ammonia, with gentian, will be needed. Bleeding, purgatives, sedatives, and irritating applications, are mostly *baneful.*

INFLUENZA.—This is a peculiar low typhoid affection of a catarrhal character. It assumes a variety of forms, in proportion to the organs which are involved. At times it prevails among horses as an epizootic, attacking animals over a vast tract of country, and from which numbers often die.

The causes, which are difficult to understand, have been pronounced to be atmospheric; nevertheless, I have found the disease most prevalent in badly ventilated and crowded stables, and particularly if the animals are exposed to rough weather during the day, and badly fed.

Symptoms.—Dullness, weakness, hanging of the head, occasional shivers come on; the pulse becomes quick, small, and weak; the mouth is hot; membranes injected, but of a dirty pink colour. The animal staggers and reels when made to walk, the respiration becomes quicker, appetite lost, throat is sore, cough is present, and torpidity of the bowels exists, which ultimately gives way to diarrhœa. In some cases effusion of a watery fluid takes place beneath the skin, under the chest and abdomen, and probably in one or more legs, giving them an appearance of being double their usual size. The liver is sometimes the principal organ affected, when, in addition to the usual signs of low fever, we have a dirty yellow appearance of the membranes. When the lungs are attacked, we have soon offensive breath, rapid prostration, and death. If the digestive organs, stomach and intestines, are the seat of the affection, diarrhoea sets in, as a sequel to a short-lived constipation, which speedily carries off the animal. The brain not uncommonly suffers with other organs, and we have stupor. At another time the disease exhibits all the forms of a most intractable rheumatic affection, in which the joints and tendons swell, and leave the animal very lame.

Unfavourable terminations are indicated by increasing weakness and stupor; the pulse becomes thready, irregular, and indistinct; the legs and ears become cold as clay, and death ensues about the fifteenth or twentieth day, the animal dropping down insensible in most instances.

P. M. Appearances.—A tendency to rapid disorganisation of all the organs of the body is at once observed, the muscles are soft and flabby, and of a yellowish hue. The respiratory track from the fauces to the lungs is covered with thick frothy mucus, and the membrane beneath is dark coloured, and often of a greenish black. The lungs are heavy, full of dark blood and offensive lymph, and in proportion as the serous membranes have been attacked we find watery effusion within the chest, with the membrane lining the cavity roughened, and covered in places by irregular patches of lymph, which possess feeble coagulating properties. Blood changes are observed upon the heart and peritoneal surface of the intestines, as evidenced by the dark patches; and the mucous surface is in some cases ulcerated.

Treatment.—Nothing kills so readily in this disease as empirical treatment. Bleeding, blistering, and purgation, with other debilitating remedies, produce great mortality; but with good nursing and housing, warm clothing, nutritious diet, and by pursuing a proper method of medical treatment, not more than one or two per cent. is lost. At least this has been my experience.

Our first attention should be directed to the carrying out of all the principles which secure comfort and warmth; while plenty of cool pure air is obtained, with a freedom from draughts. The legs should be bandaged, and rugs and hood placed on the body, all of which must be removed regularly, and the body gently rubbed down, to produce a feeling of comfort. Keep the animal quiet, give good beds, maintain regularity of the bowels by linseed gruel and clysters. A little nitrate of potass, or the sulphate of potass, epsom salts, or glauber salts, should be given in the water. If aloes are used as a laxative, a small dose only, say two drams, will be needed, as there is a strange sensitiveness to the action of medicines. The following may be given as a ball, night and morning:—

℞. Ammonia	2 drams.
Nitre	2 ,,
Belladonna	½ ,,

If the throat is sore, and swallowing difficult, make up a thick mixture of the following:—

Alum	3 drams.
Belladonna	6 ,,
Treacle	½ Pound.
Flour to make a paste.	

Apply this to the tongue two or three times a-day by means of a flat stick. Rub the throat with ammonia liniment. *Signs of Recovery* are usually manifest in about a week, when tonics and stimulants, as gentian and nitric ether, will be needed.

DIABETES.—Polyuria or profuse staling is a disease engendered by improper food, irregular living, and occurs always conjointly with a state of indigestion, and poor state of the blood. Kiln dried, or musty oats, inferior hay, &c., are prolific causes. It occurs besides as a sequel to other diseases of a low type, as influenza, strangles, &c. The water of some localities is said to produce it, and especially when the animal is heated. It also arises when no particular cause can be assigned, and will attack one horse out of a number, and at other times affects the whole. In the latter case, however, we are more certain to succeed in finding causes in the food, &c.

The *Symptoms* are intense thirst. A cob pony of 13½ hands—my last patient—affected with this disease, would swallow four pails full of water successively, and shortly after deluge the stall with urine. The discharge of urine, often surprising, is colourless, and rarely exceeds the density of water itself. The condition falls off rapidly, the coat becomes rough and staring, a voracious appetite gives way to capriciousness, and is eventually lost, and if the disease is not checked, it will probably end in glanders.

Treatment.—A full diet of sound food will be needed, with a large loose box or covered yard, that exercise may be taken. Correct the bowels by a mild laxative, and give one or two drams of the iodide of potassium, three times a day in water, and three or four drams of carbonate of soda in the food, night and morning. The perchloride of iron, in one or two dram doses, or solution of arsenic, one ounce, the former two or three times, the latter once a day, have been attended with good results.

The *Preventive Treatment* consists in avoiding irregular habits, bad food, &c., instituting a thorough system of feeding, commensurate with the work required. In turning out to pasture, select dry ground and good grass. And high dried hay should be freely mixed with the best, if it *must* be used, but where good horses are valued, such hay is worthless.

FARCY is an insidious disease which arises as a result of blood-poison from bad feeding and impure stables, and occurs also as a sequel of debilitating diseases, in which treatment has not been pursued in accordance with a correct knowledge of their real nature. Farcy arises in old, or ill-conditioned animals which are neglected, and when such are turned upon low wet unproductive cold land, they suffer from colds, &c. Causes of a debilitating character, long applied, without mitigating efforts, are fruitful sources of farcy. It is the forerunner of that formidable disease glanders, and may be considered the threshold of it. The poison of farcy is the poison of glanders, under mitigated circumstances, occupying a different situation within the system.

Symptoms.—Farcy consists of hard, indurated swellings of the absorbent vessels and glands—particularly those of the hind extremities. They are chronic in character, and remain for weeks sometimes before they burst, and are located over the course of the vessels named, forming long, hard, and inflamed cords, knotted here and there throughout the direction. The order of formation of these swellings, generally takes place from below upwards, and at first is observed on the inner side.

Inflammation going on in the parts—itself the result of poisoned material—developes new material also of a poisonous nature, lymph of a low order, which is thrown out from the glands and blood vessels into the adjacent tissues beneath the skin. This shortly softens, the skin above is absorbed, as small abscesses form — with a hundred others of a similar character—which do not take on this healing action. While these swellings are intact, they are termed buds, but when they burst and discharge, their character calls for them the term "ulcer." Their numerical character, in many instances, are so great as to give the appearance to the limbs of having been literally riddled. It is, however, the manageable form of glanders if treated early.

Treatment.—Strict sanitary measures must be rigidly enforced, as well as perfect isolation—isolation of no ideal character, but of the most exclusive kind; separate stables; separate attendants, stable tools, pails, flannels, sponges, &c., &c., if the other horses on the establishment are not to suffer. One animal affected with farcy will be found sufficient at once to give an adequate amount of information as to what the disease may be in its nature.

Poison is in the system, it must be eliminated. A peculiar tendency towards debility is present, as well as a low vitality, and to arouse the proper emunctionaries, requires the greatest caution.

The bowels must be moved occassionally, but not forcibly. For this purpose use two or three drams of aloes, with one or two of gentian, or linseed oil, half a pint, with a scruple of quinine or infusion of quassia.

Tonics and stimulants must be used, the syrupus ferri iodidi, iodide of iron, and iodide of potassuim, gentian and nitric ether, &c. The bisulphite and hyposulphite of soda have been used with benefit. Doses of the medicine selected being given twice each day, while the skin is scrupulously attended to by grooming and clothing, &c. The ulcers should be touched each day with nitrate of silver, caustic potash, or what is best, the hot iron, so as to produce healthy action. Good food must be insisted upon, as oats and oatmeal gruel, hay tea, linseed tea, the natural and artificial grasses, bulbous roots, &c.; not omitting exercise, which should be taken apart from other animals. At best the disease is very tardy, and the prospect of cure in old and emaciated animals far distant. In such cases keeping them under treatment propagates the malady to sound stock, unless the most rigid attention be paid, which cannot always be ensured from grooms and farm men. It is, therefore, a matter of economy in some instances to put such an animal out of the way. Young animals, on the contrary, are worth a trial, but indiscriminate mixing with other animals should not be allowed, even under the pretence of work, as I have seen some farmers carry on to their neighbour's detriment, by the principle of carrying contagion into every stable where the affected brute is tied up.

Prevention.—To prevent farcy is to prevent many other diseases, as pneumonia, and all diseases of the respiratory organs, influenza, &c., *in fact, almost all.* Institute a system of thorough cleanliness and regularity in feeding and working horses. Let the food be of the best, and most easy of digestion. Secure perfect ventilation in the stables, with trapped drains and freedom from draughts; *admit the sun and light,* not by apologies for windows, but by legitimate panes of glass of rational dimensions, protected if you like, against the carelessness of grooms and boys, by wire gauze work or perforated zinc; but admit the light. *It is a purifier,* and a most powerful one too. See that all the drains act and are well flushed once or twice a week. And here I would again urge the use of M'Dougall's disinfecting powder; that also manufactured by the London Sanitary Company, and Condy's fluid; all are unexceptional and improve the quality of the manure, as well as prevent the formation of noxious gases. Condy's fluid forms also a good application to the ulcers of farcy, and a good agent in addition is Robbins's oxygenerator, by which a quantity of oxygen can be eliminated with boiling water and breathed by the animal to his great benefit, during the affection. It is impossible to speak sufficiently in terms of praise of these excellent preparations.

GLANDERS.—This formidable and loathsome disease, like farcy, is communicable to man. Both are, therefore, highly contagious, and as introduced by inoculation, run their course very rapidly, the victim usually dying raving mad within 48 hours or so.

Glanders is not only unmitigated, but rather highly aggravated farcy. The physical signs are ulceration of the lining membrane of the nostrils in most instances. It first becomes thickened and the glands in the vicinity take on the action also, they become hot and tender, and the submaxillary glands appear as if fast to the jawbone. Pustules appear on the membrane of the nose, which shortly burst and leave a raw aggravated wound with ragged edges and raised centre. A thick—sometimes greenish—fluid is secreted and flows from them down the nostrils. Perhaps the left only is affected. It is very strange, but it commonly happens that the left is the only side thus affected. Other swellings of glands in various parts of the body take place, the pulse becomes quick and irritable, appetite capricious. Ulceration goes on and destroys the *septum nasi*, diabetes sets in, farcy buds appear if they have not already done so; emaciation proceeds rapidly, and a peculiar choking cough announces the ulcerated state of the lungs and throat. The *exuviæ* have an offensive odour, and such cases succumb quickly. These are the acute stages. Those termed chronic often occupy weeks or months, and some cases years, and if well fed work well to the last.

The disease is incurable.—A horse labouring under the affection should be at once shot on the score of humanity, as well as for the avoidance of contagion.

Although farcy and glanders are now not so frequently seen—thanks to the interest which agriculturists have taken in their horses—they, however, exist in too many places, and I have reasons to state, not as a result of spontaneous origin, from the causes usually laid down as inducing either, but from direct contagion occasioned by the unlimited movements of horses neglected, who are said only to have "a slight cold." Our town public-house stables favour this disorder; and because horses enter them, and do not contract the affection, is no disproof of the mode of conveyance. To understand the *modus operandi* of these diseases, and for the farmer to understand his own interest, is to study philosophically himself, and cause his sons, especially who are to succeed him, to do so, the theory and practice of Agriculture collaterally with Veterinary medicine. He will thus understand that in all cases "prevention is better than cure," and how to value the aid of him, whom he employs as his Veterinary Surgeon.

The *Preventive treatment* of glanders is to be found under the head of farcy.

HEREDITARY CONDITIONS AND DISEASES.

There are certain states which are present at birth, either constituting in themselves actual disease, or otherwise bordering upon it, that in breeding it would be wise to avoid their descent, by the choice of animals which do not possess these states in themselves. As for instance, mares or stallions with imperfectly formed hocks transmit the peculiarity to their offspring, and this conformation predisposes the young animal to the formation of spavin, &c., &c. Animals may be born healthy, but disease arises in consequence of the strain of severe work on imperfectly or inadequately formed joints. The same occurs with others in their tendency to contract ring bones, side bones, ruptures, &c.; to become roarers, broken-winded, vicious, indolent, fiery, &c., &c.—all are alike hereditary. Accidental states, or those changes in form produced by diseased action itself, the consequence of direct injury, are not as a rule handed down. There is sufficient, however, to afford ample warning to those who wish to perpetuate a breed of good horses.

In one district I operated upon more than fifty foals in two seasons—colts and fillies—for exomphalus, or rupture at the navel, present at birth, the result of breeding from one stallion kept in the locality; and during the stay of that animal in the neighbourhood I could obtain tidings of more than fifty others which were born in a similar condition. I have been able also to trace disease, in no small degree, of the feet, arising from the peculiar predisposition of form being handed down from animals affected with disease in those parts, as well as of spavins, and other conditions which tend to render our horses worthless.

It is lamentable that our system of breeding horses should be carelessly conducted. So long as we neglect to choose sires and dams, and breeding horses is a matter of compulsion, and considered disagreeable, we must expect abnormal states and conditions, all of which, in the end, cause the expenditure of much valuable time and money without effecting one quarter of the good which it should be fairly expected to represent.

If we would have sound animals, those which have not exceeded five years old should be chosen, and these having special reference to soundness and good formation, void of all diseased tendencies and habits which eventually become disease; and, if we would preserve them in their soundness, we should feed them in accordance with the nature and requirements of their digestive organs, and work them as if we valued their lives, and looked upon them as forming a great portion of our valuable stock.

DISEASES OF THE NERVOUS SYSTEM.

These are few in the farm horse. Several are of a sympathetic character, or depending upon disease in other parts. They merit a place under other heads.

PHRENITIS, or inflammation of the brain, Mad-Staggers, as it is also called, occasions symptoms of the most alarming character, the animal appearing as if bent on literal destruction to everything around. It is mostly confined to horses of a higher state of breed, and is often incurable, from the difficulty attending treatment. It consists of inflammation of the covering of the brain, with internal derangement. Blood-letting and purgation must be insisted upon if the animal can be approached, and active blisters to the poll or neck must not be forgotten. In the early stages, during the comatose state, and while the pulse is full and slow, this may be accomplished, but if neglected at that stage no good can be effected afterwards. If the first chance is lost, a most unsatisfactory termination is sure to ensue.

TETANUS, or Lock-jaw, consists of a peculiar condition of the nervous system, particularly of the spinal chord, by which involuntary contractions of all the muscles take place continually. The legs are stiff, rigid, and set wide apart; the tail straight and quivers; the jaws are fixed, rendering mastication or deglutition impossible; the eyes are fixed, and, if the head is raised, or when the animal moves, they are drawn inwards, and exhibit the white or haw abundantly. The nose is poked out, all the muscles are hard and rigid, and the animal moves as if in one piece. There are two varieties—Traumatic and Idiopathic—the former arising from injuries or wounds, &c., and the latter from other and obscure causes. In young animals it arises from cold and constipation. In older ones, exposure to inclement weather, deficient food, pricks from nails, cuts, wounds, fractures, &c.

Treatment is very uncertain. First lock up the door, and allow no one to approach but he who can do the most good with the greatest care and effect. Warm rugs, bandages, clean straw, good ventilation, freedom from draughts, and a dark isolated box. Prussic acid, woorari poison, nicotina, indian hemp, belladonna, chloroform, ether, blood-letting, and purgatives—all have been tried with variable success. The secret lies in the cause and its nature, which is sometimes of a most obscure character. In general, purgatives first, succeeded by prussic acid or belladonna, have been most useful. Seven, eight, or even nine drams of aloes have been given without any effect having been produced. If, however, the bowels can be opened, and the peculiarly obstinate constipation which exists overcome, a partial cure is estimated. Belladonna should be next given in dram doses between the teeth, every two hours. Enemas of warm water persistently applied, and succeeded by injections of ether or prussic acid, in tolerably large doses. Enemas of tobacco smoke are highly efficacious. All known wounds should be poulticed or fomented, to promote a discharge of pus; but, as a rule, blisters and setons are very much more injurious than beneficial.

PARALYSIS occurs at times from sprains of the back, which affect the spinal chord; it also arises from affections of the brain, tumours in the ventricles, &c., of which paralysis is only a symptom. That form to which the farm horse is most liable, arises from injuries to the vertebral chain, and as a consequence of effusion into the canal in influenza. I have known it arise from hard work, inducing inflammation of the cord and membranes in young animals. It sometimes affects one half, but mostly the hinder parts of the body.

Treatment.—If it arises from injury to the spine, no cure can be effected. When it arises as a sequel of influenza—good food, laxatives, comfortable housing, stimulants, and tonics, with mild diuretics, as iron and nitre, &c. In some cases, strychnia may be used.

DISEASES OF THE RESPIRATORY ORGANS.

The respiratory organs of farm horses are liable to attacks of disease, the various forms of which are catarrh, laryngitis, or sore throat, bronchitis, congestion, and inflammation of the lungs, and pleurisy.

CATARRH, or cold in the head, consists of inflammation of the mucous membrane which lines the nose and cavities of the head. The pale flush of colour which in health is seen on this membrane, becomes heightened to redness. At first it is dry, and afterwards there exudes a watery discharge, which becomes thick and purulent. Cough is not necessarily present, nor are there symptoms of much constitutional disturbance. Neglected cases of catarrh, by following the aerial track, often result in the establishment of chronic cough, bronchitis, or even inflammation of the lungs, and glanders.

Treatment.—Supply cool fresh air; keep the body warm by rugs and clothing, and legs by bandages. A mild laxative may be needed, and clysters of tepid water used with advantage in constipation, which is often present. The food should be soft and laxative, in which four or six drams of nitre may be given for three or four days.

If the throat is sore, and the animal cannot swallow easily, apply oil or spirits of cantharides over the outside, and use alum water and treacle to wash or gargle the mouth.

The most common causes of catarrh are sudden alterations of temperature, standing after being heated, or in perspiration—a common cause with farm horses, the driver allowing them to remain at the land's end some considerable time, either during an idle gossip with some should-be passing friend of a similar calling, or at a public house door, while his lunch is being eaten; draughty stables, or a want of ventilation, also are fruitful causes.

LARYNGITIS, arising from similar causes, often exists as a distinct affection, and if neglected, proceeds with complications of other organs.

Symptoms.—Inability to swallow fluids or solids, the former returning by the nostrils; the parotid, and sometimes submaxillary glands are swollen, hot, and tender, and the guttural pouches are loaded with pustular discharge from the lining mucous membrane.

The pulse is but slightly accelerated in ordinary cases, but as the disease becomes protracted, and deglutition more difficult, it then assumes an irritable and weak character, the urine is diminished and highly coloured, eyes bloodshot, temperature unequal, and sometimes a sore suppressed cough is present. Death sometimes results from protraction caused by the inability to swallow or breathe, an event, on some occasions, prevented by opening the trachea or gullet to pass down nutritious fluids, and by the continued use of stimulant and nutritious lavements or clysters.

Treatment.—Use incessantly an astringent gargle or electuary, as proposed for the sore throat of catarrh, and blister the outer side with the oil, spirits, ointment, or acetous tincture of blistering flies. As soon as food can be taken, allow green food, or carrots, or Swede turnips, parsnips, and hay tea for drink, with doses of aromatic spirits of ammonia, or two oz. spirits of nitric ether, with three or four drams of powdered gentian twice a day. Greater advantage will be derived by dividing the quantities recommended into three doses, one to be given in the middle of the day.

BRONCHITIS sometimes may be said to exist as a separate disease, but more frequently is associated with disease of the substance of the lungs. The causes are those which we have already enumerated for catarrh and sore throat.

Symptoms.—A short hard cough is present, which, by its frequency, teases the animal very much; the throat is affected more or less; respiration is accelerated, and pulse is hurried, soft, yet compressible. Unequal temperature is observed, the coat stares, secretions and excretions are checked. Shortly the cough becomes more frequent, and at length softens with declining severity. If the ear is placed to the course of the windpipe, in front of the neck, the effect of passing air up and down, and being obstructed by secreted thick mucus from the inflamed tube branches, will be plainly heard as a forcible rasping gurgling sound.

Weakness sets in at an early period, as a result of imperfect oxygenisation or aeration, which, if not arrested quickly, ends in death.

Treatment.—Provide a good loose box, which must be airy, roomy, and well littered with fresh straw. Use disinfectant powders, and particularly Robbins' Oxygenerator,* a valuable preparation in chest and blood diseases. Warm clothing—hood and bandages—should be supplied. Astringent gargles for the mouth may be required in the event of accompanying sore throat, and as a medicine wherewith to combat the affection of the bronchial tubes. Aconite (Fleming's) given in solution ten to fifteen drops, may be given, with two drams of nitre every two hours or so.

The extract of Belladonna, with nitre, has proved very serviceable in my hands, and when much weakness and general prostration ensues, aconite, ten drops, with aromatic spirits of ammonia, one ounce every hour or two, adding or diminishing one or other of the agents as symptoms indicate or direct.

Mustard embrocations, simple mustard and water, should not be omitted over the course of the windpipe and front of the chest. Blemishes may be avoided by gently washing off the paste after one or two hours.

If the cough proves troublesome, continue the astringent electuary, and administer a ball three times a day, containing—

Carbonate of ammonia....	2 drams.
Camphor	1 ,,
Belladonna	½ ,,

Discontinuing, of course, the aconite and ammonia mixture.

Returning health is quickly observed in the increased gaiety and cheerfulness of the patient, return of appetite, normal secretions, and evacuations; one of the first symptoms being that the animal has resumed the habit of seeking rest by lying down.

CONGESTION OF THE LUNGS occurs in young, ill-conditioned, badly fed, or over-worked animals, and in those in which a state of plethora exists. All horses are more or less subject to it if the causes are prevailing. It may be said to constitute a state prior to, and bordering on, inflammation of the lungs, those organs being surcharged with blood, which interferes with their functions. Sudden cold after severe exertion will produce it. Although we have the accumulation of blood in the lungs, there is no direct effusion or exudation within their substance; the blood vessels are full, and their distended state—no circulation scarcely going on—causes pressure on the structures closely approximating, and thus prevents the passage of air over so large a surface as formerly. Hence we have blowing respiration, the elbows turned out, and at first a full but oppressed pulse, which gradually becomes weak and indistinct, stupor and stertor of breathing comes on, with copious perspiration, and if not relieved the animal soon dies.

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* A valuable agent recently introduced in medicine, manufactured by Robbins, Oxford Street, London, which disengages oxygen rapidly on the addition of boiling water.

Treatment.—Bleeding is resorted to by practitioners in this disease during the full state of pulse, and is attended with beneficial results. Put on plenty of clothing, remove him to a large airy box, and administer half a pint of brandy or whisky, which should be repeated in 90 minutes or two hours. The practitioner will use ammonia in its various forms, and nitric ether—all of which are splendid agents.

I have known the disease to recur frequently in the same patient, if the domestic treatment and work, &c., is not carefully attended to.

INFLAMMATION OF THE LUNGS.—*Pneumonia*, or inflammation of the substance of the lungs, is usually ushered in by a shivering fit of greater intensity of duration as the severity of the attack may occasion. This is followed by an irregular heat of the skin, hot dry mouth, with other mucous membranes reddened and dry. The pulse numbers 70 or 80 beats, is full and oppressed, countenance is expressive of anxiety; respiration is accelerated, numbering perhaps 30 to 35, or more, the action being quick, laboured, and short, the principal movement being witnessed in the abdomen—the chest being kept as much a fixed point as possible. The animal stands fixed and dogged, with outstretched limbs, protruding head, and nostrils dilated, every effort being made to bring into use the auxiliary muscles of respiration, and provide, by means of those parts of the lungs yet unaffected, sufficient air for the large amount of blood going through them. The back is fixed and rigid, constipation exists, urine scanty and highly coloured, and the skin is harsh, dry, and tight to the body.

Cough is not invariably present at first, but is not such a distressing symptom as in bronchitis or pleurisy. Auscultation and percussion enable us to form a definite idea of the state of matters within. If the ear is placed to the side of the chest, behind the shoulder, the usual respiratory murmur is quite absent, and in its place, over the affected parts, a crepitation or rattling is heard, similar to the sound emitted from paper when crushed up in the hand. Of course this varies in proportion to the amount of space affected. Sometimes only one lung is seized, usually then the whole gland is silent, as far as the murmur is concerned. If both are affected, the abnormal crepitation and inaudibility of respiratory murmur are confined to the posterior portion. The free parts are characterized by a greater degree of sound and action. The expired air is hotter than natural, and, as the disease advances, greater difficulty in breathing exists, coldness of extremities, and patches of perspiration ensue over the body. The bronchial tubes also suffer more or less, and modify or aggravate the symptoms as the case may be.

If the chest be tapped with the fingers, a dull, heavy sound is produced, in place of the sonorous tone of health.

Consolidation of one lung is effected by exudation of plastic material from the blood of the capillaries within the substance of the lung tissue, and afterwards renders it impervious to the action of air. The right lung usually suffers most, and sometimes alone. Pleurisy, or inflammation of the pleura, mostly accompanies severe cases of pneumonia, and is then known by the title of pleuro-pneumonia.

Terminations of Pneumonia.—This may be effected in a variety of ways, as *resolution, abscess, gangrene, and death.*

Resolution is that termination which implies a removal of the disease, the animal being generally convalescent early in the second week, or perhaps sooner. In the other varieties or terminations death usually takes place from the twelfth to fifteenth day.

P. M. Appearances.—Consolidation of affected lung. The presence of interstitial exudation of lymph gives the substance of the organ the mottled appearance of marble, not unlike the liver, and is heavy, being unable to float, but sinks in water. This is called hepatisation, from its resemblance to the liver.

In other cases abscesses have formed in the substance of the lung, which are filled with fetid matter. These sometimes communicate with the lesser bronchial tubes, and thus partially evacuate their contents, which gives rise to a peculiar, startling, moist, hollow cough. Gangrene is the death or separation of the part from the general circulation—a condition which soon seals the fate of the animal; while abscess does not immediately cause death, but admits of the sufferer lingering on for some time with wasting body, capacious appetite, and cavernous cough, fetid breath, small weak pulse, &c., when absorbtion of the matter from the surface of the bronchial tubes takes place, and the end of the patient is arrived at by the setting in of hectic fever.

Treatment.—In the early febrile stages of acute pneumonia abstract blood to the extent of six or eight quarts, according to the size and condition of the patient. A laxative ball should be given, and enemas of warm water used. Fleming's tincture of aconite, 10 to 20 drops every ten hours, in cold water, or extract of belladonna, one dram, with two of nitrate of potass, in bolus or watery mixture, until the mouth begins to assume a moist, cool condition. Warm rugs and bandages, as well as an airy box, will be needed, a faithful attendant, trained to implicit obedience, and the means of cure are greatly enhanced.

If the patient, however, is observed during the shivering stage, a strong stimulant, as carbonate of ammonia, or the aromatic spirits of the same salt, should be given at once, six drams of the former, or one or two ounces of the latter, in a quart of gruel or lukewarm ale, followed up by thick rugs and good housing and nursing. In some instances the attack is arrested at this stage, and the animal speedily becomes convalescent.

When the lungs are decidedly implicated, after the first day or so blisters on each side and front of the chest will be required. This will be best effected by first fomenting with hot water, and afterwards applying mustard embrocation—simple water and mustard.

General weakness, which follows such an attack, will require a tonic treatment, for which purpose spirits of nitre, one ounce; powdered gentian, three or four drams, may be given three times a-day for several days, afterwards give balls of gentian or sulphate of iron and nitre, four drams of the former and two of the latter, twice a-day for a week or fortnight if required. When pneumonia prevails as an epizootic disease it is principally of a typhoid character, in which blood-letting is inadmissible. The treatment consists in the exhibition of salines and stimulants, good food and clothing, as already stated.

PLEURISY.—The lining membrane of the chest is known by the name of the pleura. That which also envelopes the lungs bears the same name—*Inflammation of the Pleura* is termed *Pleurisy*, or *Pleuritis*, and sometimes exists in combination with pneumonia, in fact, it amounts to a difficulty in many cases to distinguish pure pneumonia, from the symptoms running into each other, according to the organs and space involved.

Symptoms are not unlike those of pneumonia. A fit of shivers usually precede the attack, with hot mouth, arrested secretions, and all the indications of an extensive fever. The animal stands still, fearing to move, and teased with a short frequent and dry painful cough. The pulse is quick, firm, and corded, and respiration is conducted very carefully, the respirations being long, while the expirations are more quickly performed. The flanks are tucked up and the abdominal muscles are brought into requisition to fix the ribs, so as to mitigate the effects of motion. This causes a line of constriction along the sides of the chest and abdomen, corresponding to the muscles which cover them. If the fingers be pressed between the ribs great pain is evinced, percussion over them causes a dull sound, while a rasping noise is heard if the ear be applied to the sides of the thorax.

Relief in many cases appears to be speedily obtained. In periods varying from 12 to 40 hours, or even up to three days, a cessation of all symptoms take place—the breathing is more regular, legs become fine, temperature tolerably equal, and a desire for food may be evinced, but these often prove very deceptive; in short, exudation or effusion has taken place within the chest. The once over-loaded vessels, whose stretched coats admitted of their fluid contents to escape, and thus circulation again proceeds, but not normally. The pulse will be found weak and oppressed, and quicker than usual, the nostrils are dilated, and a flapping action is evinced, a difficulty of breathing comes on, the sides heave, the animal is dull, the legs swell, and œdematous swellings occur along the chest. The pulse becomes very irregular and indistinct, and the presence of fluid may be detected by the absence of murmur, and a dull sound emitted on percussion below the line to which the effusion may have reached.

Recovery depends upon the extent to which the effusion has reached. Should the quantity be but small, recovery is almost certain, but in large quantities, say above one third or up to one half, the case is of a very hopeless nature indeed.

At other times the disease assumes a chronic character, and the resulting effusion of fluid within the chest accumulates gradually, death occurring at various periods in from three to five, or nine weeks, from causes equal to actual drowning; the pressure of the fluid interfering with, and even totally arresting the functions of the heart and lungs.

In more favourable cases the acute symptoms are not often so speedily subdued. Inflammation runs a more regular course, the effusion is less abundant, and there is afforded greater opportunity for contemporaneous absorbtion.

Pleurisy seldom exists without more or less affecting the heart coverings or its valves, and in severe cases, we may have death ensue from a decided implication of that organ, when we have an intermittent pulse, particularly if effusion has taken place, in the heart bag. When the valves are affected, we have in addition great prostration and inability to withstand exertion, swelled legs, and the animal blows greatly if caused to draw or exert himself beyond his accustomed habit.

Treatment.—Good airy loose boxes, with clean litter and clothing, are the essential requisites. Blood-letting in first stages of a full pulse, to the extent of six, seven, or eight quarts; but blood must not be abstracted carelessly, as effusion may have commenced, and the proceeding would kill the animal of a surety.

Stimulants must be given during the shivering stage in tolerable doses. Blisters or mustard applied to the chest after blood-letting has been effectual, which should be carried on till the animal falters. Laxative medicine, as three or four drams of aloes, will be needed, and clysters should supplement their use. Much care will be needed in the use of other medicines during the action of the aloes, as an undue action of the bowels may be brought on, which will carry off the animal. Aconite—ten drops every ninety minutes—will be needed; or extract of belladonna and nitre, as recommended for pneumonia. Aconite has a disadvantage of causing an abundant flow of saliva, with champing of the jaws, occasioned by a peculiar sensation on the tongue and fauces. Its effects, however, in careful hands, are productive of great benefit. It is well that this agent should not be pushed too far, and I would recommend its discontinuance as soon as the more acute symptoms have subsided, following up with belladonna and nitre, or opium and calomel, of each half a dram, given in a bolus every three hours, about six doses of which should be given. One of the best forms of medicine which can be given, but whose effects require marked attention is—

Nitrate of potass	2 drams.
Camphor	1 „
Powdered digitalis	½ „

Made into a ball, and given three or four times a day. One dram of the extract of belladonna may be advantageously made to take the place of camphor—or given in addition, as fancy dictates; but the rule should be, as *few* medicaments as possible in either bolus or mixture.

Absolute quiet is necessary, and thirst may be relieved by bran water, hay tea, or plain water, with nitre or sulphates of magnesia or soda dissolved in it. Soft laxative food, as bran mashes, grass, turnips, carrots, or such edibles, will be needed. Convalescence may be looked for in about a week, with cheerfulness, regained appetite, the animal rests well, equal temperature prevails, thirst is abated, mouth moist and cool, pulse regular and fuller, &c.

Effusion, when present, will need the use of tonics and stimulants, with diuretics, as aromatic spirits of ammonia, half an ounce; powdered gentian, two drams; tincture of digitalis, two drams, four times a day. In more chronic or exhausted cases, these doses, except the digitalis, may be doubled, given at the same time, or sulphate of iron and nitre may be given in doses of two drams each, twice or three times a day. Iodine or the iodide of potassium may be given with spirits and gentian.

Sometimes the fluid is drawn off by mechanical means. An instrument, having a round blade and sharp point, with a silver ferrule, is introduced between the ribs, near the bottom of the chest, and after withdrawing the former, the fluid escapes through the tube or canal which is left for the purpose. Stimulants will be required conjointly with the operation; but in most cases few survive where affairs have proceeded so far as to call for its use.

CHRONIC COUGH frequently happens to horses after one or several attacks of catarrh, sore throat, or bronchitis. The term is usually intended to define that state of the respiratory apparatus in which a cough is present, not amenable to medical treatment. In horse phraseology, "it is settled at the chest." Most of such cases depend upon derangement of the nerves of the throat, windpipe, &c., or upon some abnormal state of the lungs—one produced by the effects of repeated colds on the air passages, the other the result of similar effects on the lungs themselves. The cough of broken wind may be essentially termed chronic, since the causes are eminently so, as well as the disease broken wind itself.

The *Treatment* must depend upon the nature and causes. That form arising from broken wind must be met with by remedies for that disease. There are forms of chronic cough, which, existing but for some short time, are to be removed, and after several attacks of cold, &c., exhibit a hacking, hard, short, expulsive sound. In the first variety, relief will be speedily gained by the use of carbonate of ammonia, two drams; extract of belladonna, one dram, given each day for ten or twelve days. Half a dram of opium, calomel, camphor, and digitalis, have proved of immense advantage in affording relief in the second or incurable varieties.

THICK WIND, ROARING, WHISTLING, &c.—All these are modifications of one state, or only differing in degree.

The causes may be located, 1st, within the nostrils, in the form of a polypi, or tumours of flesh and bone, occasioned by blows, &c. These may be of various sizes and growth, and so produce partial respiration through the nostril affected, and totally prevent it. 2nd. The larynx or throat, through the medium of the nerves going to the part, may be constricted or malformed, owing to the preponderance of action in the muscles of one side, and wasting of those on the opposite, thus producing a twisted position and altered passage. 3rd. Thickening of the lining membrane of the throat, windpipe, and bronchia. 4th. Tumours on the epiglottis, or vocal chords. 5th. Malformation, or fracture of the windpipe.

Treatment consists in allowing free ventilation, proper food, both as to quality and quantity, removal of tumours, which may be the cause; but where the disease depends upon such lesions as nervous derangement, construction, and malformation, it clearly must be incurable. Various remedies have been tried, with as varying success, and palliations may be found in wearing a tube inserted in the windpipe in front of the neck, secured by a strap; pads also have been applied to the nostrils, which remove the tendency to produce the sounds characteristic of the disease. The malady is usually of a chronic character; the causes which develop the sounds are protracted in their process of being matured, so that treatment, except in the cases referred to, is not productive of much good.

The *Preventive Treatment* for diseases of the respiratory organs are careful housing and freedom from draughts, avoiding standing exposed to wind and rain. Stables should be well ventilated, and kept at an even temperature of 60° or thereabouts. All bad smells should be investigated and suppressed. Horses with long coats brought into a cold, draughty stable, or allowed to stand in the cold air after violent exertion, often suffer very badly; and on the other hand also those that are clipped. Extremes should be avoided. Great care, proper clothing, and avoiding of debilitating and cooling medicines, with properly apportioned work and good stable management, are the secrets of preventing, not only of these, but all nearly of the diseases to which the farm horse is liable.

DISEASES OF THE URINARY AND GENITAL ORGANS.

NEPHRITIS, or inflammation of the kidneys, is not frequently observed in the domestic animals. It, however, does occur at times among farm horses, and chiefly from eating inferior food, as kiln dried oats, heated or musty hay, excessive use of strong diuretic medicine, and the influence of sprains on the back and loins. The *Mercurialis Perennis*, or common herb mercury, will produce it, and various other plants, at certain seasons of the year. The symptoms are those of excessive fever, pulse irritable and quick, numbering at least 90 or 100. The animal strains, and stands stretching, with hind legs wide apart. The urine is highly coloured, and sometimes bloody. After death the external membrane shows signs of inflammation, whilst the internal structures of the glands are disorganised, softened, and gorged with blood.

Treatment.—Mild laxative medicine should be given at once, and hot rugs placed over the loins and body, bandages to the legs. and the utmost quiet enjoined. The medicines best to be given are aloes or linseed oil, extracts of belladonna, hyoscyamus, or tincture of aconite (Fleming's), as advised already, in the respective diseases. A strong mustard embrocation should be placed on the loins, and enemas of tepid water and soap or salt employed every half-hour until the bowels act. Alkalies in very small doses, as the bicarbonate of potash or soda, should be allowed in the drinks, which should be thick and mucilaginous, as linseed tea, gum water, &c.

BLOODY URINE arises from the causes which produce inflammation of the kidneys, wholly or partially, and degeneration of the mucous membranes of the urinary passages, by which secretion urine is suspended and blood transudes unchanged. If the *treatment* recommended for nephritis should not succeed, use astringents, as sulphuric or tannic and gallic acids, in dram doses given in water; opium and catechu, kino, sulphate of iron, perchloride of iron, &c., are highly useful. When fungous tumours are present, and disorganization or calculi occur, the disease is incurable.

INFLAMMATION OF THE WOMB, HYSTERIA, METRITIS, &c., is not uncommon in the breeding mare. It occurs from obscure causes as well as from obvious habit of body or maltreatment during parturition. The *symptoms* are excessive fever, dullness, accelerated respiration and circulation, and shortly violent straining takes place. A discharge of a brownish or coffee coloured character occurs from the external organs. The animal is uneasy and often is inclined to lie down. The disease is mostly confined to young animals, and occurs some days after parturition. Peritonitis usually accompanies the affection.

Treatment.—Hot fomentations to the loins, and afterwards mustard. Laxative medicines, as aloes or linseed oil. The repeated straining will require such medicines as belladonna, opium, hyoscyamus, or Fleming's aconite. Belladonna and nitrate of potass will be most useful. Mitigation of symptoms and recovery must be met with the assistance of tonics, as infusion of quassia and perchloride of iron, the sulphate of iron, gentian, &c., &c.

INVERSION OF THE WOMB AND VAGINA takes place after roughly handled cases of parturition, as a result of irritation set up by injuries, &c., and may also arise from excessive constipation at the time.

I have seen it in young animals which have been put into slings when a limb had been broken. It is sometimes incurable from the difficulty of suppressing the violent efforts to strain on the part of the animal, and impossibility of retaining the organ in position, or probably mortification which speedily ensues.

Treatment.—Give a dose of opium, say three or four ounces of the tincture, foment the protruding parts with hot water and return as carefully as possible. Some persons afterwards place a few stitches across the vulva, but this is objectionable on account of the irritation they produce; others fix the animal by means of large pads to the external organs and a cart breechband, which, when properly performed, is not always a bad proceeding towards preventing a return of the organ. Extensive wounds produced during parturition often give rise to the disaster. These should receive special attention so as to mitigate pain, which would lead to the formidable occurrence.

LEUCHORRHŒA, or the Whites, is a disease of the mucous membrane of the womb of a chronic character, and occurs after parturition. It is evidenced by the discharge of white odourless and flaky matter from the external organs of generation.

Treatment.—Give laxative medicine, and follow up by sulphate of iron, or gentian and nitre.

INFLAMMATION OF THE BLADDER occurs from the presence of calculi, but is not a common occurrence under any circumstances in the horse.

I have known it arise from the practice of mischievous boys inserting pieces of stick through the vagina in mares.

Symptoms.—Incontinence of urine, which is scarcely ever bloody or high coloured, it comes away as fast as it enters the bladder. There are symptoms of fever, irritable pulse, pain, uneasiness, &c., &c., and loss of appetite.

Treatment.—Exactly as for nephritis, but care must be observed as to the use of laxatives, as in some cases the bowels participate in the disturbance and diarrhœa sets in.

Preventive Treatment.—Avoid strong diuretic medicines and bad food, &c., and institute careful management. Those diseases of the urinary organs which do not depend upon morbid or malignant states are mostly to be rectified by these means, being results of the errors of diet, &c. In parturient mares allow of no interference except by practical hands, and not then, unless nature is fustrated in her efforts by mal-position or mal-formation of the foal, &c.

PHLEBITIS.—Inflammation of the jugular vein. This is by no means uncommon, particularly among those horses where the master or groom views bleeding as a necessary act to ensure health. Practice, even in mischief, we imagine, would bring expertness—but it is not always so in bleeding. Owing either to the dirty state of those surgical hatchets called phlemes, or the numberless times it has been driven into the vein, inflammation sets up, effusion takes place around it, as well as on the inner side, and the result is, the passage is blocked up by a cylinder of lymph, and in process of time becomes one mass of organised material. Sometimes the imperfect pinning up of the wound, or the presence of hairs or other foreign matter allowed to be included, produces all the effects described. At other times it may be caused by the animal rubbing himself; or the presence of the insect which is the cause of mange having crept into the wound when animals suffering from that disease have been bled. Such a result is always to be dreaded in that disease.

Inflammation arising from inflamed vein sometimes extends to the head, and death ensues; but loss of the vein in all cases produces inconvenience when the animal is turned out to grass, swelling of the head and neck, owing to the deficient return of blood, being a natural consequence.

Treatment.—Keep the animal perfectly quiet, and tie up the head for some hours as soon as the heat, pain, and swelling indicate what is going on. Poultices and fomentations may be tried with advantage, along with laxative and sedative medicines, when they can be used. If the vein continues hard and corded. apply a blister three successive days, avoiding the orifices of the wound.

DISEASES OF THE ORGANS OF VISION.

OPHTHALMIA, or CONJUNCTIVITIS. Inflammation of the superficial membranous covering of the eyeball, is a common occurrence to farm horses. It occurs from blows occasioned by a whip lash, from the intrusion of hay seeds, oat flyers, chaff, and other bodies, which occasion a violent irritation. It also occurs from exposure to cold winds, and as a result of, or sequel to, other diseases, as strangles or influenza, &c.

Symptoms.—The eye is half closed, and copious tears are discharged; the surface of the eyeball is white, rough, and opaque, but in the earlier stages dull, and the vessels are enlarged and injected with blood. The inner surface of the eyelids are reddened, and the whole organ is hot and tender.

Treatment.—Remove all foreign bodies by means of the fingers, a pair of forceps, or anything which may enable the act to be accomplished—sometimes the handkerchief, or a camel hair pencil will answer very well indeed.

Weak zinc or lead lotion will be found necessary, and a laxative should be administered. Goulard's extract, in the proportion of half an ounce to one pint of water. Sulphate of zinc, five grains; nitrate of silver, three grains; or alum, five grains to the ounce of water, in the forms usually found useful, applied several times a day.

Modifications in the treatment will be required when the disease accompanies low typhoid fevers, as influenza, &c.

SPECIFIC OPHTHALMIA, commonly called Moon Blindness, from the frequency with which the disease is known to occur, is a disease affecting the choroid coat of the eye. It consists of inflammation and infiltration of yellow lymph, and is commonly associated with common or conjunctival ophthalmia. The functions of vision are destroyed by the action. The causes are those which act both locally and generally—as of the first, impure stables, and the effect of cold winds during perspiration, &c., &c.; and of the second, as constitutional affections of a rheumatic character, influenza, &c. Some time ago I saw fifteen pairs of farm horses deprived of sight, as a result of an ill ventilated stable; and about the same period, a gentleman, who purchased several hunters, successively returned them on account of a supposed pre-affection of the eyes. Prior to the fourth being returned to the dealer, I was called, and detected the cause in the want of ventilation, the groom having *stopped all the outlets to make a fine coat.* The first case cited was caused by nothing more than a stupid adherence to the ideas of one of the farm men who was particularly knowing about horses.

Symptoms.—Intolerance of light, with weeping and half or wholly closed eye, the appearances are much the same as in common ophthalmia to an ordinary observer, but after a few days, there is no hesitation in pronouncing upon the internal nature of the malady.

The disease recurs on the slightest exhibition of the original causes, and as other parts are involved, greater tendencies occur for its reappearance. The iris refuses office—adhesions having taken place it is immoveable—its edges are also roughened and jagged. The membraneous covering or capsule of the crystalline lens becomes also affected, and deposits of lymph occur, beneath which constitute what is known by *cataract.*

Treatment.—In first stages some people abstract blood, and administer physic. I think aconite will answer without the bleeding, particularly if well followed up with nitre and colchicum—as follows :—

Nitrate of potass	4 drams.
Colchicum	2 ,,
Belladonna or powdered opium......... ...	1 ,,
Tr. Aconite (Fleming's)	10 drops.

Given three times a day in bolus mixed with treacle, and a little flour, or a scruple each of opium and calomel may be given as often for two days.

The affected eyes have always a diminished appearance, and should be regarded with suspicion by all purchasers.

Prevention.—Secure perfect ventilation and freedom from noxious vapours. When horses go long distances, and during wet weather particularly, provide good loin covers. Animals should not be allowed to stand exposed to cold piercing winds during perspiration. Their susceptibility is particularly roused by heated stables, and want of ventilation. This disease is most notoriously hereditary, therefore dams and sires suffering from it should be discarded for breeding purposes.

DISEASES OF THE FEET.

If there is one department in connection with the care of horses which requires *special* attention, it is that of management of the feet. From an absence of proper regulations we have diseases spring up which might otherwise be averted, and our horses preserved throughout longer periods of usefulness.

Pricks and Binds from shoeing are not uncommon. These may arise either from a degree of carelessness, or they may be altogether unavoidable with the most careful and skilful workman, arising from a difficulty of finding attachment for the nails, owing to the feet having been broken considerably by the animal having lost a shoe, and travelling some distance, or the integrity of the foot perverted by the too frequent use of the knife and rasp.

The foot of the horse is composed of a box or hoof, in which is a closely fitting series of tissues, of the most exquisitely sensitive character. These describe a shape exactly similar, but smaller of course than the outside, therefore we shall see that the hoof acts the part of a shell of uniform thickness around the whole, sometimes not exceeding three-eighths of an inch in some horses, whilst in the largest animals it will not exceed four or five-eighths. To this shell the shoes are attached by nails, the latter being driven in a perpendicular direction up the sides, so as to emerge about one and a-half inches or more above the shoe, and form a clench for tightening the whole. In driving nails, sometimes the sensitive portion within is either injured or included by the nail, which is called a prick or puncture; whilst at others, the nail either being too thick, or driven too near, or both, the sensitive parts are severely pressed, and in all cases the results are inflammation, pain, and lameness. Cold weather retards the process considerably, from which the animal is allowed to proceed without attention, and, as in all the other cases of injury described as occurring to the feet, the matter, formed by the process of suppuration, by augmentation finds its way out at the top of the hoof, or probably has burrowed throughout the extent of the solar surface.

Suppuration arises in the foot from other injuries, such as picking up a nail, the point of which has entered the hoof and sensitive structures; bruises from cart wheels, treads from other horses, stepping on the teeth of an upturned harrow, injuries by stable forks, &c., &c., all of which are likely, by inattention and mismanagement, to become complicated, and not only end in the destruction of the hoof and other tissues, but also the horse himself.

Treatment.—In all cases of lameness the foot should invariably be examined. If pain is not too severe to admit of the animal standing on the affected limb, raise the opposite foot from the ground, and have it held by an assistant while the affected member is tapped on the outside with a hammer, over the region of the nails, when, if the injury is there, he will quickly flinch. If lameness is but slight, removal of the offending nail will probably be all that is required. It is a decided error to pare away the hoof and explore the foot in such cases. Such a proceeding is not surgery or treatment, but *maltreatment*, and the result of confirmed ignorance on the part of the operator.

Extensive inflammation cannot go on in the foot without evincing various and rapidly increasing lameness, except, as I I have stated, in severely cold weather, when the process will be delayed and prolonged, but in a few days longer probably, particularly during a return of milder weather, all the severe signs, as extreme halting and pain, will be evidenced. This peculiarity belongs to foot lameness, arising from the causes enumerated; and in the case of severe inflammation having commenced, and running on to suppuration, lameness increases every hour, until the shoe and offending nail be removed. At another time the same results may arise from injuries inflicted by a nail which has not been allowed to remain in the foot, owing to irritation from the presence of dirt, sand, &c., which has worked its way into the injured parts.

In such cases, therefore, being assured that matter has formed by the extreme lameness, throbbing of the arteries at the pastern, heat of foot, and general disturbance of the system, remove at once the shoe carefully; ascertain the exact seat of the disease, and open the hoof at the nail hole, without cutting too much of the horn away; secure a provision for the safe exit of all matter, which may be hastened by hot fomentations, followed by hot poultices. Relief is soon obtained if the proceeding is properly done; and when the shoe is again applied the nail must be omitted at the part, and, to avoid the entrance of dirt to the wound, a little dry tow may be laid lightly over it, and a leather sole placed under the shoe before being nailed on, or a piece of leather cut to fit the space between the foot and shoe will act very well, and has the advantage of being made to fit tightly, and admit of removal without disturbing the shoe.

QUITTOR is a disease arising from injuries to the coronet or top of the hoof, either by treads, blows, pricks, or the ulceration consequent upon the formation and exit of matter from the hoof. It consists in a destruction of the parts and the existence of sinuses—or pipes of the farriers—with walls of condensed tissue, leading to the interior of the structures of the hoof. These also further become damaged by the presence of matter which cannot obtain a natural exit, but continues to destroy surrounding parts and leave the tortuous canals in their place ramifying in all directions, until the animal is become worthless from the great lameness and irreparable damage done to the component parts, hoof, bones, and softer tissues.

The disease is always chronic, and if improperly treated, protracted, and unprofitable; but well managed, the cure is easy.

Treatment.—Keep the parts thoroughly clean and the animal at rest; poultice to induce a more vigorous exit of matter, and afterward inject strong zinc lotion, or weak sulphuric, or nitric acid, solutions of nitrate of silver, or caustic potass, or bichloride of mercury in hydrochloric acid and water, five or ten grains to the ounce.

Proper attention should be paid to the foot. A proper level bearing should be given and the animal allowed to go shoeless on soft dry litter or bark covering. Determined treatment will usually effect a cure in three weeks.

CANKER is one of those diseases of the feet which is not only troublesome, but also frequently accompanied by constitutional taint, and treatment of which not uncommonly proves a most unprofitable proceeding. It is present as the result of defective stable management, filth, and wet. Sloppy manure yards are fertile sources, and wet ground not behind in the list of causes, if bad feeding and housing is added. Like grease, it may be considered as partaking of the character of low vitality, in fact, it may be considered as a degeneration of the structure of frog and hoof, the sole particularly. The tendency to destruction is extreme. What ulceration is to the softer tissues, canker is the same to the hoof, it softens, and in its place is supplied by fungus which is composed of a series of blood vessels which bleed on the slightest touch. The power of formation of horn is abortive, the contiguous parts are implicated, pain is extreme, especially after some of the rude dressings employed by men who always pretend to the repair of a machine, the internal arrangements and mechanism of which they know nothing of.

Treatment.—Keep the feet dry—apply pressure by means of a shoe and iron plate, or splinters of wood across, and dress by means of sulphuric or nitric acid and Barbadoes tar; about two drams of acid to eight ounces of tar.

Rapid growth of hoof in the wall is a consequence of the usual actions in canker. This must frequently be lowered to produce pressure, an effect as useful as most dressings, and towards effecting a cure, the application of astringent remedies as already advised, must be unremittingly and scrupulously persisted in.

Confirmed cases seldom pay for the amount of trouble and attention required.

Treatment of convex soles from Laminitis.—Give a level bearing to the foot, enjoin rest on soft dry surfaces, encourage the growth of horn by the use of hoof ointment, and remove none except for the purpose of effecting a proper diffusion of the superincumbent weight. The toe being the principal portion where the growth takes place, will require shortening, but not recklessly; great judgment is required.

Apply a shoe which bears entirely on the crust or wall, and which is *made to fit* accurately the foot. This can only be done after a course of treatment has been pursued on the feet, as stated above, but by which many good horses would be—in fact, have been—restored to a period of extended usefulness after being about to be consigned to the knacker.

Great evils result from *over*-shoeing. The frequency with which our town horses are shod induces such a wear of the feet, coupled with, and greatly as an effect of the absurd system of paring and rasping, that one is surprised how the animals can bear their own weight, much less perform the severe running they are called upon to do on the hard stones. But a more absurd system still remains to be told. After the whole reduction of the hoof, by knife and rasp, leather soles and tar are used *to protect the foot.* First break the animal's head and subsequently provide a plaster. In the town of Manchester, Liverpool, Newcastle-on-Tyne, and other large towns, this prevails to an unusual extent.

Fortunately for the farm horse, he wears but few shoes, and therefore goes seldom to the smith, who as fortunately cares so little about shoeing generally, as to avoid the trouble of paring too much.

CORNS.—Corns are the manifest signs in that portion of the sole of the fore foot, called the implex or heels, of an injury committed on the sensitive structures beneath, principally the sensitive sole, it is usually stated. Dissections, however, which I have made, and investigations carried on, demonstrate the implication of other and even harder structures being included. The discolouration is the result of the changes within, and the whole mostly a result of too great use of the drawing knife and rasp, &c., in shoeing, conjointly with which we have also hard work on hard stones, &c., &c. Farm horses are seldom shod, their feet are not subject to these periodically and regular inflictions, and are, therefore, less liable to corns than town horses. To this they owe their immunity.

Treatment.—Provide a proper and level bearing for the shoe, preserve the integrity of the hoof; abolish the foolish system of paring out the corn, give the horse something to stand upon in the shape of his naturally strong hoof, and keep it strong by a regular dressing of hoof ointment once or twice a week.

The secret of prevention as well as cure of corns lies in a good preservative system of shoeing; if that cannot be effected by the smith who has the care of the animal's feet, no dressing whatever will. I have ridden a mare some years, up to the present time, badly affected with corns in both fore feet. The preservative system of shoeing has been fully carried out, and upon that alone I have to base her great ability to carry me over the many miles of hill and dale, often 40 or 50 miles a-day.

Writers on the horse's foot usually recommend a system of paring away, because they know of nothing else to advance. It is certainly very easy also to advocate such treatment, and is a sure indication of the small amount of practical acquaintance they possess of the art, as well as true nature and physiology of the foot itself.

Why the weight bearing portion of the horse should be so systematically reduced is a principle which certainly has no analogy in art or science. If he kept his feet on soft carpets or straw, moved only as the wants of nature dictated, and had no weights to draw or carry, no trotting or galloping on hard stones and roads to do, then we might attempt to "improve nature." In his case, as at present viewed, it is destruction to the hoof, and indirectly to the animal himself, by the production of collateral states, which end in causing him to be useless.

Corns are the precursors to more serious states, and is a warning which, if taken in time and acted upon, saves the animal, and prolongs his usefulness. Neglect them a while, or maltreat them by paring, and we have all the results to be found in a worthless animal.

Certain shapes of hoof are stated to be pre-disposing causes. Granted! But ninety per cent. of such pre-disposing causes would never take effect if a proper system of shoeing was carried out.

RINGBONES and SIDEBONES are deposits of bony matter, usually described as efforts of nature to strengthen the parts. The former are present round the pastern and fetlock front; the latter are ossified cartilages of the hoof. In my own candid opinion these are nothing more or less than the results of action which nature has been *compelled* to carry out. It is no effort to strengthen, but a consequence of diseased action, arising from modified influences brought about by hard work, bad shoeing, &c., hereditary taint probably facilitating the occurrence. Horses badly shod suffer more readily from these affections than farm horses, or others even doing hard work on stones, whose feet are well attended to and preserved. Concussion no doubt has its potent influences, but if our horses' feet were more cared for it would have less.

THRUSH consists of an ichorous and offensively smelling discharge from the fissure or cleft of the frog—a discharge arising from a local inflammatory action of sub-acute and low vitality in the sensitive frog, indicated by a slight degree of pain, and sometimes lameness.

Causes.—Neglect in shoeing, heels becoming too high, and thus taking the parts from natural and healthy stimulus pressure.

Treatment.—Lower heels, so as to bring foot nearer to the ground, or run barefoot at grass for some time: otherwise, if the animal can be spared, in a clean loose box; and press into the crack each morning a little alum powder, or drop in a few drops of spirits of salt. A diuretic ball should be given once during the case. In a few days or weeks all will be well.

Neglected thrushes are forerunners to other diseases, by involving other structures and lessening their vitality.

Prevention.—Maintain the functions of the foot by regular and systematic shoeing.

SANDCRACK is another result of hoof neglect and reduction. It consists in a splitting or cracking of the hoof from above downwards, and by allowing of the interposition of the sensitive laminæ within during its expansion gives rise to excruciating pain and lameness.

In the fore feet these cracks are sometimes located at the quarters, in the hind at the toes, but these are by no means regular.

Treatment.—Use blistering ointment to the coronet once every week, or apply the actual cautery across the top of the crack, taking care that the sensitive portions are nearly reached, and afterwards apply the blister ointment, and allow the animal rest. If properly managed, nothing more is required beyond caring for the hoof, adopting a proper system of shoeing, and the use of hoof ointment, consisting of mutton suet, Barbadoes tar, and olive oil, in equal parts.

SPRAINS—LAMENESS.

Sprains occur to farm horses as a result of hard drawing at heavy weights, and other accidental causes. They may consist of laceration of the fibre of muscle, tendon, or ligaments, and give rise to more or less severe pain and lameness. The most common seats of lameness arising from the sprain of muscle are loins, shoulder, and some portions of the extremities. Lameness from sprain of tendons and ligaments are located in the lower parts of the extremities, at the hip, point of shoulder, elbow, stifle, and most joints.

The indications are heat, pain, and sometimes swelling, with inability to use the affected part, with halting more or less. In affections of these kinds the leading symptoms of mal-action are as follows :—

In the Hip.—The toe of the hind foot on the side affected, is dragged along the ground.

Shoulder.—The whole limb is carried and dragged, the toe also touching the ground.

Elbow.—The weight cannot be borne, the limb is flexed, and during movement often carried in advance.

Stifle.—The limb is carried outwards in a swinging manner. If the loins are affected there is a reeling, staggering gait of hind limbs, and signs of weakness.

In other joints, besides the indications first mentioned, there is a difficulty of standing on the affected member, the joint is usually flexed to save the parts involved, the toe resting on the ground under the body, or but slightly in advance if a forefoot.

To understand lameness, the sciences of anatomy and physiology are needed, and it is impossible here to go farther into such a subject.

The treatment consists of laxative medicines, cold lotions to the part. Arnica lotion is invaluable, with rest for sprains of tendon or ligament.

If muscles are affected, hot fomentations are of decided service in conjunction with other treatment described. And after the inflammation has subsided, apply a smart blister over the part, or the firing iron.

FRACTURES seldom occur; however, some of the bones are at times broken, and the great difficulty in effecting a cure is in being unable to keep the animal still. If he be a quiet, docile animal, starch bandages, or gutta percha, moulded to the limb, may be used with splints, and the patient placed in slings. The most curable fractures are those which occur transversely or longitudinally in the long metacarpal or shank bones, ribs, &c. The pastern bone often is comminuted, and recovery is attended with stiff joint. Fractures of the spine are incurable.

EXPERIMENTS WITH DIFFERENT VARIETIES OF WHEAT, IN 1864 AND 1865.

By ROBERT J. THOMSON, Grange, Kilmarnock.

[*Premium—Fifteen Sovereigns.*]

THE amelioration of climate which the cutting down of growing timber, the drainage, and the cultivation of the past century have effected in Ayrshire, has enlarged the wheat zone from small patches in early or sheltered localities to all drained lands under an altitude of 300 feet; and on most farms, now-a-days, under 200 feet, where the soil is suitable, wheat has become a regular crop of the rotation.

In the heavy land districts of Cunningham and Kyle—which are pre-eminently the wheat growing districts of Ayrshire, and in one of which the experiments hereafter detailed were made—the variety of wheat which obtains all but universal favour is the Woolly ear, known elsewhere as Velvet ear, Rough-chaff, Essex fluff, &c. This variety is earlier than many others; it is short and stiff-strawed, and therefore does not lodge readily; it is very prolific, and its grain is a favourite with the miller. But it has one fault, which is a great disadvantage—especially here, where our harvests frequently are wet—the wool on the ear retains the rain drops, and causes it to sprout more readily than any other variety. It is therefore a desideratum in the above-named districts to obtain a variety having all the advantages of the Woolly ear, and free from its defect; and it was with the view of ascertaining whether any of those mentioned in the Highland

Society's premium list would supply the want that we undertook the experiments, the details of which form the body of this report.

It has been found that seed of English growth is more productive, and yields a better quality of grain, than home-grown seed; and the custom of importing seed from Essex, or some other of the southern counties, is almost universal. This practice is very good evidence, if evidence were wanting, of the fact that the productive qualities of a variety are impaired or improved by the circumstances under which it is grown—a phenomenon which perhaps has not yet received the attention it merits, but which should make us careful of placing too much reliance on the results of experiments in which different varieties are compared.

We ordered all the seed for the following experiments from Messrs Peter Lawson & Son, Seedsmen, Edinburgh, explained to them the object in view, and desired them to exercise care in obtaining the varieties true to their kind, and all grown as near to each other as possible.

On the next page we have tabulated the temperature and rainfall in each week from March to September inclusive in both years, and also a comparison of the seasons 1864 and 1865, with the average of the last fifteen years.

1864 *Experiment.*

The field in which this experiment was made stands at an altitude of 90 feet. It is situated about six miles east from the Frith of Clyde, and about one mile west from the town of Kilmarnock. The soil is a dark brown clay loam, about twelve inches deep; the subsoil is yellow clay, with a few small boulders in it. It is drained at about 22 inches deep, and 18 feet apart. The course of cropping has been as follows:—1861, oats, after three years old pasture; 1862, wheat; 1863, green crop. In anticipation of this experiment, the drills in 1863 were run across the line of the ridges, so that all the plots used for experiment would share alike in any difference of treatment, and the manures applied both to the wheat in 1862, and to the green crop in 1863, were the same throughout. A portion of the field was divided into plots, four ridges in breadth, containing rather more than an acre in each, and the most favourable "tid" in November was taken advantage of for committing the seed to the ground.

No of Plot.	Name of Variety.	From whom bought.	County where grown.	When sown.	Weight sown lbs	Weight per bush	Size of plots sown	Sown per Acre		
								Lbs	Bush.	Lbs
							acre			
1	Hopetown	P. Lawson & Son	East Lothian	27th Nov.	203	63¼	1·098	185	2	58
2	Woolly ear	,,	Mid ,,	,,	203	61½	1·087	187	3	2½
3	Fenton	,,	East ,,	28th Nov	202¼	62½	1·046	193	3	5½
4	Hunter's	,,	,, ,,	,,	203¼	63	1·057	192	3	3

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* It was found, on weighing the bags, when brought home from the field, that, by a strange coincidence, almost the same quantity had been sown from each.

TABLE OF TEMPERATURE AND RAINFALL PER WEEK FROM 1ST MARCH TO 27TH SEPT. IN 1864-65.

Date. Week ending.	1864.					1865.				
	Temperature.			Rainfall		Temperature.			Rainfall	
	Mean max.	Mean min.	Mean.	Ins.	Dec	Mean max.	Mean min.	Mean.	Ins.	Dec
Mar. 8	41·1	32·2	36·7	0	45	52·3	32·2	41·2	1	14
„ 15	42·8	30·5	36·6	2	44	51·1	28 1	39·6	0	26
„ 22	48·1	34 2	41·2	0	30	51·1	27·3	39·2	0	00
„ 29	46·7	29·4	38·5	0	36	48·0	27·2	37·3	0	62
April 5	48·5	34·8	41·6	1	24	53·8	34·5	43·9	0	29
„ 12	58 1	41·5	49·8	0	27	51·4	39·2	45·3	0	27
„ 19	57·7	33·2	45·4	0	64	57·4	35·8	46·3	0	20
„ 26	60·5	41·5	51·0	0	05	65·0	37·0	51·0	0	04
May 3	57·4	37·4	47·4	0	30	58·2	36·4	47·3	0	21
„ 10	58·7	41·1	49·9	0	06	58·0	40·5	49·3	0	33
„ 17	65·2	42·1	53·6	0	69	57·1	42·1	49·6	0	37
„ 24	67·5	46·8	57·5	0	51	69·0	44·4	56·7	0	46
„ 31	58·0	36·1	47·1	0	16	67·5	47·4	57·4	1	81
June 7	58·3	38·5	48 4	0	61	63·4	43·2	53·3	0	29
„ 14	64·2	46·1	55·1	0	50	65·1	44·8	54·9	0	01
Carry forward............				9	61	...	...	...	6	80

Date. Week ending.	1864.					1865.				
	Temperature.			Rainfall		Temperature.			Rainfall.	
	Mean max.	Mean min.	Mean.	Ins.	Dec	Mean max.	Mean min.	Mean	Ins.	Dec
Brought forward	......	......	......	9	61	......	......	......	6	80
June 21	68·0	49 2	58·1	1	35	72 0	42·2	57·1	0	00
„ 28	58·7	46·4	52·5	0	41	66 3	48·0	57·1	0	30
July 5	59·1	48·0	53·5	1	15	73·2	46·7	59·9	0	49
„ 12	67·3	43·0	55·4	0	00	68·5	48·2	58·4	0	75
„ 19	70·5	46·5	58·5	0	00	67·2	47·8	57·1	0	92
„ 26	64·0	51·5	57·7	0	58	71·2	46·5	58·8	0	06
Aug. 2	66·5	49·8	58·1	0	98	63·2	48 0	55·6	0	37
„ 9	61·2	43 7	54·9	1	26	68·0	49·0	58·1	0	06
„ 16	66·5	46·1	56 3	0	00	66·8	48·9	57·8	1	61
„ 23	62·2	41·4	51·8	0	08	64·8	47·0	55·9	0	55
„ 30	64·1	37·7	50·4	0	32	67·2	46·6	56·9	2	28
Sept. 6	64·7	45·8	55·2	1	81	66·2	50·7	58·4	1	02
„ 13	64·7	44·0	54 3	0	98	72·3	53 0	62 6	0	35
„ 20	58·7	42·5	50·1	2	67	76·2	49·1	62·6	0	42
„ 27	61·2	44·0	52·6	0	89	65·8	42·8	59·0	0	06
Total,...	59.5	41·7	50 6	21	99	68·2	42·5	52·9	16,	04

A COMPARISON *of the Rainfall and Number of Wet Days in the Months March to September in* 1864, 1865, *and the Average of the last Fifteen Years.*

Month.	1864.			1865.			Average of last 15 years.		
	Rainfall.		Wet days.	Rainfall.		Wet days.	Rainfall.		Wet days.
	Ins.	Dec.		Ins.	Dec.		Ins.	Dec.	
March.	4	38	15	2	29	13	2	91	16
April.	1	87	11	0	57	10	2	00	12
May.	2	25	10	3	16	19	2	53	14
June.	2	94	21	1	47	7	3	64	18
July.	2	47	8	2	22	19	3	77	16
Aug.	2	00	11	5	11	17	4	29	17
Sept.	6	08	20	1	24	11	3	21	16
	21	99	96	16	06	96	22	35	109

The temperature was taken by Mr. Henry Gibb, gardener to Elias Cathcart, Esq.. Auchendrane House, Ayr, and the rainfall by Mr. Thomas Thomson, North Craig, Kilmarnock.

Owing to much frost in December and the beginning of January, the braird was longer in making its appearance than usual, but on January 8th all were distinctly visible. There was no perceptible difference between them. The spring of 1864 was characterized by severe frost and strong sunshine, and was particularly trying to young wheat; so much so, indeed, that many fields had to be ploughed down and sown with oats or barley, and all the lots suffered less or more. The Fenton and Hunters seemed to have suffered fully more than the others, at least they were always yellower in colour; but all were even, from crown to furrow, and were sufficiently thick on the ground. After the coarse, wet weather in March and beginning of April, there was a long period of dry forcing weather till the end of May, in which all the lots made great progress. Two sharp nights' frost in the beginning of June blackened a number of the leaves of the Hunters; the others were only very slightly affected. In July, when the wheats were in flower, the weather was all that could be desired—dry, warm, and calm. August also was a fine month.

On September 5th, the head ridges at both ends of the plots were shorn, and avenues 3 feet wide were cut out between the lots, the produce of which was carried off to the end. The breadth left of each plot was then measured, and other avenues were cut near the farther ends of the plots, so as to leave standing exactly an acre of each.

The Hopetoun looked ripe on September 5th, but, owing to wet weather, was not shorn till the 7th. The others were cut as they came ripe. None of the lots were at all laid. All were cut dry, but rain fell to some extent every day till they were stacked; there was always sufficient wind, however, to prevent sprouting, when the stooks were kept on end.

They were put up, two in each stack, with a thick division of oat straw between them.

No. of Plot.	Name of Variety.	Came in ear.	Ripe and Reaped.	Carried.	Thrashed.	Size of Plot.	Produce and value of Grain per acre.				
							Lbs	Weight p. bush	Q. b. lbs	Price per qr.	
											£ s. D
1	Hopetoun	5th July	7th Sept.	20th Sept.	31st Oct.	1 Acre	2045	62	4 2 5	42s.	8 18 11
2	Wooly ear	1st ,,	7th ,,	,,	,,	,,	2220	59	4 5 0	39s.	9 0 4
3	Fenton	8th ,,	9th ,,	,,	1st Nov.	,,	2201	61½	4 4 40	41s. 3d	9 9 0
4	Hunters	9th ,,	10th ,,	,,	,,	,,	2040	59½	4 2 0	39s. 6d	8 7 10

No of Plot.	Name of Variety.	Light grain, lbs.	Chaff.		Produce and value of straw.				Value of grain and straw.
			cwts.	lbs.	cwts.	qrs.	Price per cwt.		
								£ s. D	£ s. D.
1	Hopetoun	46¾	2	65	33	1	2s.	3 6 6	12 5 5
2	Woolly ear	47	2	74	29	1	,,	2 18 6	11 18 10
3	Fenton	37	2	83	32	0	,,	3 4 0	12 13 0
4	Hunters	39	2	69	32	1	,,	3 4 6	11 12 4

The season 1864 in Ayrshire was an average one for wheat, and the above results are fair samples of our average crops.

1865 *Experiment.*

The field in which this experiment was made stands at an altitude of 100 feet. The soil, subsoil, and drainage are similar to the field used last year. Both fields lie well to the sun, are unprotected by wooding, and are almost entirely free from game.

In 1861 this field carried oats, after three years old pasture; 1862, Italian ryegrass; 1863, oats; 1864, drilled beans. The manures applied in 1862, 1863, and 1864 were the same throughout the land used for experiment.

The second week of November being dry and settled looking, the land was ploughed, and laid off before sowing in plots of one acre each, with a two feet division between them. Owing to a mistake, only 3 roods 35 poles were laid off in plot 3; all the extensions, however, in the following tables are given calculated per acre, in order to make them comparable with the results from the other plots. The produce of 1864 experiment was used for seed.

No of Plot.	Name of Variety.	When sown.	Quantity sown.		
			Lbs.	Bush.	lbs.
1	Hopetoun	9th Nov.	196	3	10
2	Woolly ear	,,	194	3	17
3	Fenton	,,	210	3	26
4	Hunters	,,	190	3	11

The weather, from the date of sowing till near the end of December, continued unusually mild. The braírds appeared about the 5th of December, and by the 22d had pretty well covered the ground. Again there was no perceptible difference between them. From January to March, inclusive of both, the weather was seasonable; and at the beginning of April all the lots looked fresh and healthy. The Fenton and Hunters again showed lighter in colour than the Hopetoun and Woolly ear. April was dry aud moderately warm, and May was showery and forcing, and by the end of the latter month the young wheats looked almost too luxuriant. With June came drought and heat, and before the month went out the wheats were all in ear, the Woolly ear being about four days before the others. July and the beginning of August were extremely favourable for flowering and ripening, and by the middle of the latter month all the lots were ripe. They came ripe so nearly together that they might all have been shorn at the same time; the Hunters seemed fully the greenest when we were shearing them. The Woolly ear was almost all standing, the Fenton and Hunters were considerably laid, and the Hopetoun was almost wholly down. They were all cut with the hook. A considerable quantity of rain fell when they were in stook, and a number of ears of the Woolly ear in the corner sheaf, in the sheltered side of the stook (they were stooked in eights) were sprouted. When stacking this plot, these sprouted sheaves were kept by themselves, and the sample used for taking the weight per bushel, the value per quarter, and the milling qualities, was taken from the unsprouted lot. They were stacked as last year, two lots in each, and a thick division of oat straw between them.

No. of Plot.	Name of Variety.	Ripe and Reaped.	Carried.	Thrashed.	Size of Plot.	Produce and value of Grain per acre.									Lights lbs.	Chaff.	
						Lbs.	Weight p. bush.	Q.	b.	lbs.	Price per qr.	£	s.	D		sts.	lbs.
1	Hopetoun	22d Aug.	1st Sept.	18th Sept.	1 Acre	3723	58	8	0	11	38s.	15	4	10	89	4	24
2	Woolly ear	,,	,,	16th ,,	,,	4014	60¼	8	2	4	40s. 9d.	16	16	6	97	4	42
3	Fenton	,,	,,	19th ,,	0a 3r 36p	4143	57	9	0	39	37s.	16	16	5	96	4	97
4	Hunters	23d Aug.	,,	,, ,,	1 Acre	3650	59	7	5	51	39s.	15	0	7	79	3	98

No. of Plot.	Name of Variety.	Produce and value of Flour.						Produce and value of Straw.						Grain and Straw.		
		cwts.	lbs	Price per cwt.	£	s.	D	cwts.	qrs	Price per cwt.	£	s.	D	£	s.	D.
1	Hopetoun	22	41	14s.	15	13	8	61	0	2s.	6	2	0	21	6	10
2	Woolly ear	25	10	,,	17	11	8	53	1	,,	5	6	6	22	3	0
3	Fenton	23	22	,,	16	4	9	61	1	,,	6	2	6	22	18	8
4	Hunters	21	104	,,	15	7	0	63	2	,,	6	7	0	21	7	7

Samples of the grain in both seasons, and of the flour in 1865, were sent to an experienced grain-merchant, who affixed the relative values as given in the tables. Instead of taking current rates, it was thought preferable to take for a basis wheat weighing 60 lbs. per bushel at 40s. per quarter, which is pretty nearly the average price since the lowering of rates after the Crimean war. The straw is valued at 40s. per ton, which is not far from the average price in this district.

480 lbs. of each variety were sent to the mill and ground into flour. The following is the miller's return:—

No. of Plot.	Name of Variety.	Sent to Mill.	Produce of 1sts.			2nds.	3rds.	Bran.
			cwts.	lbs.	per cent.	Lbs.	Lbs.	Lbs.
1	Hopetoun	480	2	99	67	68	27	49
2	Woolly ear	480	3	0	70	54	21	38
3	Fenton	480	2	77	63	69	23	49
4	Hunters	480	2	99	67	56	23	63

This speaks highly in favour of Woolly ear, and says but little for the Fenton. The grist was too small, however, to allow of much dependance being placed on so anomalous a result.

The flours were so alike in appearance as to be practically identical in value. Samples of each were tried in the bakehouse, and the baker thought the Hopeteun best, the Woolly ear and Fenton next, and the Hunters the weakest.

The year 1865 will leave a not unpleasing record in the books of the wheat growers of this district. From the 8th of March till the crop was cut, the season was all that could be desired. A week of wet weather when the crop was in stook did much injury, but as a whole it has been the finest wheat season for many a year, and the crop is nearly double an average one.

In both years the wheats got much rain in the stooks, and, having to be thrashed before there was any frost, the condition of the samples was very soft, and hence the lightness in the bushel. We observe that in each year two of the varieties are heavier than the other two; and it happens that the two heavy ones were in both years the two at the top of the stacks. In making experiments again we should take care to put each plot in a stack by itself.

The grain of the *Hopetoun* wheat is round and plump, and white in colour. The ear is long, the spikelets being pretty widely set. The chaff is nearly white. The straw is faintly yellow, and is excellent in quality, being more than usually tough; it is longer than any of the other three varieties, and being of equal length, and the ear apparently large, the crop has a very imposing appearance when growing. This variety seems too liable to lodge for this district.

The grain of the *Woolly ear* is large, white, and long in shape, and it is said to mill well. The ear is square, with the spikelets very closely set. The chaff is white and covered with down. The straw is short, stiff, and brittle, and is white in colour; it is uniformly long, and from the time this wheat comes in ear, until it is ready for the sickle, the crop looks beautifully level. This variety is fully earlier than the others, and, with the exception of its downy chaff, is very suitable for this district.

The grain of the *Fenton* has a reddish tinge, and is moderately long. The ears are unequal in size, and the spikelets are set at about the average width. The straw is unequally long, and gives the crop a straggling appearance when growing; it is on the average longer than the woolly ear, but not nearly so long as the Hopetoun; it is thicker in the stem than either, and it is faint yellow in colour. This variety has given the greatest money return in both years for grain and straw taken together, but it will be observed, if the flour be taken into account instead of the grain, the Woolly ear surpasses it. It is, however, well deserving of further trial.

The grain of the *Hunters*, in general appearance, closely resembles the Fenton, but the prickles are clearer, and not so uniform in either size or colour. The ear is long and tapering, and the spikelets are widely set. The chaff is faintly yellow in colour. The straw is considerably longer than the Fenton, but not so long as the Hopetoun; it has a reddish yellow tinge, and is moderately tough. This variety has not given a large return in either year, and does not seem peculiarly suited to this district.

It appears to us that some of the new *bearded* varieties which we had the pleasure of seeing growing in 1864, when just about ripe, in Mr. P. Shirriff's collection, near Haddington, are worthy of a trial in this county. The beard, by keeping the sheaf open, permits the entrance of every breath of wind to dry up any moisture and harden the grain. We procured small samples of several of the best of them at the time, but they were unfortunately destroyed by wire-worm in the spring of 1865.

We have hitherto grown Woolly ear wheat almost exclusively, and, although we have frequently suffered from sprouted samples, we have still adhered to the popular opinion of the district in its favour. No doubt the opinion of a large body of men, whether that opinion be prejudiced or not, is not to be lightly thrown aside; but it cannot be denied that the results of these experiments give abundant encouragement for the prosecution of further trials.

A deputation from the Highland Society inspected the crops twice in each year, saw that the divisions were properly made, that the seed was true to its kind, and checked the measurements of the plots.

EXPERIMENTS WITH DIFFERENT VARIETIES OF WHEAT, IN 1864 AND 1865.

By PHIPPS TURNBULL, Little Pinkerton, Dunbar.

[*Premium—Fifteen Sovereigns.*]

THE farm on which these experiments were conducted is situated in the county of East Lothian, Parish of Dunbar—height above the sea, of fields where the crops were grown, about 180 feet. The ground was carefully selected, and was of uniform quality and condition, being what may be termed a gravelly loam. The field in which the experiment of 1864 was conducted had been barley in 1862 (after grass); the ground was manured after the barley was removed with good farm-yard dung, at the rate of fifteen tons per acre; in 1863 a crop of potatoes was taken, manured in the drill with 4½ cwts. per acre of a mixture of artificial manures. The potatoes were a good crop.

On 16th November, 1863, the different lots were all sown with a drill machine, the land having been previously ploughed, and manured with finely ground rape dust, at the rate of 5 cwts. per acre. From the schedules annexed, it will be observed that Lot No. 1 of Hunter's was sown one peck per acre thicker than any of the others, the reason being that I found it impossible at first starting to have the machine properly regulated and adjusted to sow the exact quantity intended.

In order to procure pure seed of the different varieties, I applied to Mr. Patrick Shirreff, Haddington, a well-known and experienced judge of grain; he, in the course of a few weeks, sent me Nos. 1, Hunter's, 2, Hopetoun, and 3, Shirreff's bearded white; No. 4 was also perfectly genuine, being purchased by myself from Mr. Hope, Fentonbarns. The ground was exactly measured and marked off before being sown—a vacant space being left between each lot.

March 28-9.—Hand-hoed the different lots, there being a good many annual weeds, and afterwards rolled with a one-horse roller.

April 26th.—Examined with Mr. P. Shirreff, and found the Hunter's a little paler in colour than any of the others. Hopetoun looking well—Shirreff's looking fully better than the Hunters and Hopetoun, principally because it is tillering out beautifully. Fenton is of a much darker green than the other varieties; it is also tillering out well, but looks if anything thin on the ground.

May 7th.—Crop inspected by a committee appointed by the Highland Society, consisting of its Secretary, J. H. Maxwell, Esq., Mr. Harvey, Whittingham Mains, and Mr. Smith, Whittingham.

July 22nd.—Measured the straw, and took the average of four different places in each lot (for height see schedule).

August 1st.—There having been a heavy gale of wind blowing for the last 24 hours, I examined the different lots, and found the Hunter's to be more damaged than any of the other kinds. I estimate the extra loss to be about 2 bushels per acre. Hopetoun a little broken down, but not so much as Hunter's; Shirreff's less damaged than any of the others. Fenton broken down, but not to any material extent.

The different lots were all cut with a reaping machine the same height from the ground; they were stacked separately, and covered in the usual way. The season was upon the whole favourable to the growth of wheat, having been dry, with an average degree of sunshine.

The ground on which the experiment of 1865 was conducted was also a gravelly loam of uniform quality and condition, the previous cropping and management having been the same in all respects as for the trial of 1864.

November 14th.—Sowed broadcast carefully with the hand the Hunter's and Fenton varieties, and on November 17th sowed the Shirreff's and Hopetoun varieties in the same manner; rain having come suddenly on, prevented the latter from being sown on the same day. The ground was previously ploughed, and manured with a mixture of rape, guano, and bones, at the rate of 2½ cwts. per acre. The seed sown was the produce of the different varieties grown for last year's experiment; the ground was, as on the former occasion, exactly measured and marked off before being sown, a clear space being allowed between each lot.

April 28th.—Hunter's looking fresher than any of the others; Hopetoun looking well; Shirreff's and Fenton not looking so vigorous as the other two varieties, but still presenting a healthy and promising appearance.

May 16th.—Examined with Mr. Harvey, and we thought the Hunter's looking better than any of the others, all the varieties however looking well.

June 6th.—Hunter's appears to be of a greener hue than the others; Fenton apparently promising to be second best.

July 5th.—Hunter's still evidently taking the lead, the others all very equal indeed.

July 29th.—Measured the straw in the same manner as last year.

Aug. 19*th.*—Cut by shearers the half of all the lots.

Aug. 21*st.*—Cut by shearers the other half of all the lots.

I could not say which variety ripened first; they appeared to be all very equal in that respect, notwithstanding the disparity of dates of sowing. This year I consider to have been also favourable to the wheat crop in this district, possessing the advantage over last year of being without any of these high winds, which so frequently damage the crop before it is fully matured.

Tables 1 and 2 shew the progress of each lot, with dates of ripening, &c., also the weights of straw and chaff; the former was weighed upon a steelyard, the latter put into bags, and also carefully weighed. Table 3 gives the value per acre in grain, straw, and chaff, of the different kinds. The weights and measures used are all of the imperial standard.

TABLE No. 1.—1864.

Lots.	Varieties.	From whom purchased.	Where grown.	Weight per bush.	Breadth sown.	Seed sown.		When sown.	When brairded.	Came in ear.	When in full bloom.	Average length of Straw	
						bush	pks					feet	in
1	Hunter's	Mr. P. Shirreff	Newtonlees	64	1 Acre	3	0	Nov. 16	Dec. 14	June 24	July 8	3	9
2	Hopetoun	Do.	Beanston	63	,,	2	3	,,	,,	,, 23	,,	4	1½
3	Shirreff's	Do.	Hedderwick	63¼	,,	2	3	,,	,,	,, 24	,,	4	1
4	Fenton	Mr. Hope	Fentonbarns	63	,,	2	3	,,	Dec. 16	,, 25	,,	3	8

TABLE No. 2.

Lots.	Varieties.	Ripe and Reaped.	Carried.	Thrashed.	Good Grain			Weight ℔ bush	Light Grain.		Weight ℔ bush	Straw.		Chaff.
					Q.	B.	P.	Lbs.	B.	P.	Lbs.	St	Lbs	Stones.
1	Hunter's	Aug. 19	Sept. 2	Nov. 9	3	6	2	62	5	0	61½	277	0	24
2	Hopetoun	,, 19	,, 2	,, 10	4	0	1	62½	4	1	61¼	306	0	23
3	Shirreff's	,, 23	,, 3	,, 10	4	5	2	63¾	4	6	62½	351	7	31
4	Fenton	,, 23	,, 3	,, 9	4	7	1	61½	5	0	60¼	323	0	27

TABLE No. 3.

Lots.	Varieties.	Value of Good Grain.				Value of Light Grain.				Value of Straw at 4d per Stone			Value of Chaff at 1½d. per Stone			Total Value per acre		
		per Qr	£	s.	D	per Qr.	£	s	D	£	s.	D.	£	s.	D	£	s.	D
1	Hunter's	36s	6	17	8	33s	1	0	7½	4	12	4	0	3	0	12	13	2½
2	Hopetoun	36s	7	5	1½	33s	0	17	6½	5	2	8	0	2	10½	13	8	2½
3	Shirreff's..........	41s	9	12	2¼	33s	0	19	0	5	17	2	0	3	10½	16	12	2½
4	Fenton	34s	8	6	9¾	32s	1	0	0	5	7	8	0	3	4	14	17	10¾

TABLE No. 1.—1865.

Lots.	Varieties.	Breadth Sown.	Seed Sown.		Weight per Bush.	When Sown.	When Brairded.	Came in ear.	When in full bloom.	Average length of Straw.	
			Bush.	Pks.						feet.	inch.
1	Hunter's.	1 acre.	2	3	62 lbs.	Nov. 14.	Dec. 10.	June 20.	July 5.	4	0
2	Hopetoun	,,	2	3	62¼ ,,	,, 17.	,, 14.	,, 20.	,, 5.	4	2
3	Shirreff's.	,,	2	3	63⅞ ,,	,, 17.	,, 14.	,, 18.	,, 4.	4	4
4	Fenton ...	,,	2	3	61½ ,,	,, 14.	,, 10.	,, 20.	,, 5.	3	10

TABLE No. 2.

Lots.	Varieties.	Ripe and Reaped.	Carried.	Thrashed.	Good Grain.		Weight per Bushel.	Light Grain.		Weight per Bushel.	Straw.		Chaff.	
					Q.	B.		B.	P.		St.	Lbs.	St.	Lbs.
1	Hunter's.	Aug. 19 & 21	Sept. 1	Sep. 20	5	3	64¼ lbs.	1	2	63 lbs.	287	7	24	0
2	Hopetoun	,,	,,	,,	4	5	65 ,,	2	1	63 ,,	228	7	23	4
3	Shirreff's.	,,	,,	,,	4	3	66 ,,	1	1	63½ ,,	232	1	31	4
4	Fenton....	,,	,,	,,	5	0	64½ ,,	1	1	63 ,,	259	0	23	0

TABLE No. 3.

Lots.	Varieties.	Value of Good Grain.					Value of Light Grain.				Value of Straw at 4d. per Stone.			Value of Chaff at 1½d. per Stone.			Total value per acre.		
		per Qr.					per Qr.												
		s.	D.	£	s.	D.		£	s.	D.	£	s.	D.	£	s.	D.	£	s.	D.
1	Hunter's............	44	6	11	19	2¼	41s	0	8	11½	4	15	10	0	3	0	17	6	11¾
2	Hopetoun..........	44	0	10	3	8	41s	0	11	6½	3	16	2	0	2	10¼	14	14	0¾
3	Shirreff's..........	46	0	10	1	3	43s	0	5	4½	3	17	4	0	3	10½	14	7	10
4	Fenton...............	44	6	11	2	6	41s	0	6	4½	4	6	4	0	3	3	15	18	5¾

REMARKS.

In thrashing and dressing the different lots, both years, great care was taken to prevent mixing; Shirreffs I found a little more difficult to thrash clean than any of the other varieties, but I do not consider this to be an objection of much importance, as, where the high speed or English drums are used, it is quite easy to put the drum of the mill a little closer to the concave, when necessary, for different kinds of grain. In estimating the value of the grain I took a fair sample of each variety, stating weight, kind, &c., and had them valued by two first-class corn merchants, according to prices at the time. I estimate the straw and chaff as if, like the wheat, they were to be sold off the ground. It will be observed, on comparing the two years, that there is not any very marked difference in the time of brairding, coming in ear, and being in full bloom, of the four kinds; in crop 1864, however, the Shirreff's and Fenton were four days later of being ripe than the other two, while in crop 1865, they were all remarkably equal in this respect.

Regarding the length of straw, in both experiments, Shirreff's may be said to be the longest, and Fenton the shortest; Hopetoun and Hunter's holding the intermediate places—the former being second longest, and the latter second shortest; the weights, however, of straw shew that the shortest (Fenton) weighs more to the bulk than any of the others. In crop 1864, Shirreff's, though measuring 5 inches longer, had only 28 stones more weight than Fenton; and in crop 1865, when measuring 6 inches longer, had 27 stones *less* weight than the Fenton. This is apparently a peculiarity of the Fenton straw, proving that it weighs better relatively to its bulk than any of the others. There is also a circumstance worthy of notice regarding the Hunter's weight of straw, it being lowest of all the varieties in 1864, and highest in 1865. I attribute this difference to the damage done by wind in 1864, as it was "more broken down than any of the others," also its having been sown one peck per acre thicker may have made the straw of that year a little softer and lighter; the produce in grain of Hunter's, it will be remembered, was also estimated to have been lessened by two bushels, owing to the wind. This is rather an objection to the variety in a stormy or windy season.

The weights of chaff are remarkably similar both years in all varieties; Shirreff's (from the beard) being heaviest, and Hopetoun lightest, both years. All the varieties, except Shirreff's, have increased in yield in 1865; in weight of straw, Hunter's excepted, they have all decreased; this must be owing to the season of 1865 having proved more favourable to the formation of grain, and less to that of straw, than 1864. The weights per bushel have also this year been higher—the grain, from the long continued dry weather, being in much better condition than last year. There is another marked peculiarity of crop 1865, in there being much less light grain than crop 1864. Shirreff's, both seasons, has less than any of the others. During season 1865, Hunter's appears all along to have had the lead, looking fresher and greener than the others, and Fenton, as noticed on June 6th, apparently going to be the second best, has turned out as it looked at that time. The exception above referrēd to in the case of the Shirreff variety, as regards increase of produce in 1865, seems to indicate that this variety is inclined to deteriorate when sown a second year in the same locality, and, for this reason, I think the seed should be changed every year. The table seems to shew that the Hopetoun variety is the most unsatisfactory experiment, and therefore not a profitable wheat to cultivate, except on some peculiar soils adapted to its growth. So far as these trials throw any new light on the subject, we may conclude that Hunter's and Fenton still hold their old place as our standard white wheats in average years. It must be admitted, however, that Sherriff's is a valuable variety, and, in some cases, on certain soils, may come well up to, if not surpass, its more established competitors.

EXPERIMENTS WITH DIFFERENT VARIETIES OF WHEAT IN 1864 AND 1865.

By JOHN RICHARDSON, Drylawhill, Prestonkirk, East Lothian.

[*Premium—Fifteen Sovereigns.*]

CROP 1864.

1. THE soil a heavy loam, with a retentive subsoil. The previous crop, potatoes, manured on the stubble with farmyard manure, and a mixture of guano and bones in drill. The potatoes, owing to the dry season, were a light crop, and no additional manure was given to the wheat.

2. Four imperial acres were measured off a part of the field where the soil was uniform in quality. Each acre was surrounded by an open space which was kept free of weeds, and used as a footpath throughout the season.

3. The four varieties of wheat, as named in the Tables, had been exhibited at the Haddington show of seed wheat, and were the best parcels that could be obtained of their respective kinds in East Lothian.

4. On the 20th of October, the seeds were hand-sown, at the rate of two bushels and three pecks per acre, having been previously dressed with sulphate of copper. The sowers were tested as to quantity of seed before sowing the experimental acres.

5. The wheats appeared above ground on the 17th November, and all equal in thickness, and got through winter and spring without loss of plant.

6. All the varieties came into ear about the 15th of June, growing and ripening together, and were cut down on the 21st and 22d of August. From the thickness of plant and the warmth and dryness of summer, circumstances have been unfavourable to displaying the peculiarities of earing and ripening of the different wheats, but in these respects they do not differ much in any season. Although little rain fell during the ripening of the crops, Hunter's became slightly lodged, while the others remained erect.

7. On the 17th February, 1865, samples of the different wheats were laid before competent judges, who valued them per

imperial quarter, thus:—Mungoswells at 36s.; Hopetoun at 39s.; Hunter's at 37s.; Fenton at 36s.

Lots.	Varieties.	From whom Purchased.	Where Grown.	When Sown.	Breadth Sown.	Bushels & Pecks Sown per acre.	
						Bush.	Pecks.
1	Mungoswells	Mr. Christie......	Cairndinnes......	20th October.	1 impl. acre.	2	3
2	Hopetoun...	Mr. Elder..........	Amisfield Mains.	" "	" "	2	3
3	Hunters	Mr. Binnie	Seton Mains......	" "	" "	2	3
4	Fenton	Mr. Hope	Fenton Barns...	" "	" "	2	3

Lots.	Varieties.	Came in Ear.	Ripe.	Reaped.	Carried.	Thrashed.	Size of Plot.	Good Grain.				Light Grain.	Straw per 22 lb. Stone	
								Lbs.	62 lbs. per Bush.		Weight per Bush.			
									B.	Lbs.	Lbs.	Lbs.	St.	Lbs.
1	Mungoswells	15th June	20th Aug.	22d Aug.	3d Sept.	25th Oct.	1 Impl. acre.	2381	38	25	62½	61	157	18
2	Hopetoun...	"	"	"	"	"	"	2169	34	61	62¼	67	150	4
3	Hunters.....	"	"	"	"	"	"	2168	34	60	62¼	60	145	0
4	Fenton.......	"	"	"	"	"	"	2417	38	61	62	66	162	20

CROP 1865.

1. The soil, for the most part, a heavy loam, inclining to clay at the lower end. The previous crops had been partly beans and partly potatoes, with manure applied in autumn across the ridges, and the drills of both crops took the like direction. By this arrangement each experimental lot of land contained the same extent of each kind of soil and the same extent of the previous

bean and potato crops, and whatever inequality existed in the applied manure, each lot had the same share in the inequality.

2. Four imperial acres were taken where the soil was most equal in quality, each surrounded by open spaces kept free from weeds, and used as footpath throughout the season.

3. The seed, as directed in the Premium Book, was taken from the produce of last year's crop.

4. On the 5th November the seed was sown with as nearly as possible the same quantity per acre as last year, viz., 2 bushels and 3 pecks.

5. The plants appeared above ground on the 1st of December, and there was no perceivable difference in thickness of plant amongst the lots then and up to harvest.

6. All the wheats came into ear about the 12th of June, and were cut down on the 18th of August. Hunter's variety was lodged by heavy rain on the 8th July, but soon afterwards regained an upright position.

7. The crops appeared more bulky than those of the previous season, but the straw proved lighter on being weighed, which, in a great measure, may be owing to the dry state of the crops when stacked and thrashed.

8. Although the soil of the different lots was very equal, there was a tree on the north side of Lot 4, but as it stood at distance of 18 feet from the extreme corner of the lot, and had only one small branch extending little more than 1 yard over it, and could neither affect the crop by its roots or shade, I consider it entirely harmless.

The Annexed Table gives the result of Crop 1865:—

Lot	Varieties.	When sown.	Bushels and Pecks sown per acre.		Came in ear.	Ripe.	Reaped.	Carried.	Thrashed.	Size of Plot.	Good Grain.				Light Grain.	Straw per 22 lb. Stone.	
			Bush.	Pecks.							Lbs.	62 lbs. p. bush. Bush.	62 lbs. p. bush. Lbs.	Weight per bush.	Lbs.	Stones	Lbs
1	Mungoswells...	5th Nov.	2	3	12th June	18th Aug.	18th Aug.	31st Aug.	21st Sept.	1 Impl. acre	2048	33	21	68¼	127	138	14
2	Hopetoun	"	2	3	"	"	"	"	"	"	2204	35	34	68½	91	137	10
3	Hunters	"	2	3	"	"	"	"	"	"	2318	37	19	68¼	96	157	18
4	Fenton	"	2	3	"	"	"	"	"	"	2454	39	36	68¼	126	157	18

EXPERIMENTS WITH DIFFERENT VARIETIES OF OATS IN 1864 AND 1865.

By Robert J. Thomson, Grange, Kilmarnock.

[*Premium—Fifteen Sovereigns.*]

As a much greater breadth of oats than of any other cereal is grown in Scotland, it is pre-eminently important that the varieties most suitable for cultivation should be generally known. Any experiments, therefore, in which some of the more esteemed varieties are compared with one another, must possess considerable value. Yet it cannot be supposed that any one single experiment, however accurately conducted, can give all the information desiderated; for if a number of varieties be sown side by side on a heavy soil, and also in an adjoining field, on a light sandy soil, the probability is that, although they are grown under precisely similar climatic conditions, the variety which yielded the largest return on the clay will not yield the most on the sand. In like manner, a difference in the climate, whether of temperature or rainfall, or both, will materially influence the comparative results, even where the soil is of similar quality; and where both soil and climate are dissimilar, the results will be still more widely different. We need not wonder, then, to find that in each district some one or two varieties are grown in preference to, and almost to the exclusion of, all others; and the importance of making comparative trials in each district, and over several seasons, is apparent.

The Highland Society has for many years endeavoured to encourage such experiments, and, in offering the above premium, wisely made it compulsory that the experiments should extend over at least two years.

Besides the varying character of the seasons, there are other circumstances which may modify the results—the influence of the seed for example. It is well known that lowland seed sown in a highland district ripens earlier and yields a greater return, and a better quality of grain than the same variety of highland-grown seed; and it has been remarked that, within certain limits, highland-raised seed sown in the lowlands takes longer to ripen, and produces a less return, and of coarser quality, than the same variety of home-grown seed. It is at least open to question, too, whether the previous cropping of the land, independently of both soil and climate, may not influence the results. Can it be supposed that the same order of priority will be maintained after old lea as after one year's pasture, after wheat as after beans, on land cropped for the first time, as on land cultivated for a century? We think not; and whether in detailing the results of an experiment, or in deducing inferences from these results, it is of importance that these circumstances be kept in view.

In the large heavy-land district of central Ayrshire in which the experiments hereinafter detailed were made, the variety of oats usually grown is the Tam Finlay (which, it will be seen, we have added to the list given by the Highland Society), and the rotation practised is, for the most part, a six shift, viz., green crop; wheat or oats; hay; pasture; pasture; oats. On many farms, however, where green cropping is said to deteriorate the quality of the pastures, two crops of oats are taken after three, four, or five years pasture; the second crop of oats being sown out with grass seeds.

The field on which the following experiments were made had been pastured for at least twenty years; and two crops of oats were taken, each variety being made to occupy the same plot in both seasons. The altitude of the field is 180 feet. It is situated about six miles east of the Frith of Clyde, and about one mile west of the town of Kilmarnock. It is unprotected either by higher land or by trees, and there is no game. The soil is of medium quality, with a number of small stones in it, and is reddish brown in colour. The subsoil is yellow clay, with several thin strata of sand, and many small trap boulders. It is well drained at about 22 inches deep, and 18 feet apart. The following table shews the rainfall and temperature in each week, from March to September, in both years:—

TABLE OF TEMPERATURE AND RAINFALL PER WEEK FROM 1st MARCH TO 27th SEPT. IN 1864-65.

Date. Week ending.	1864.					1865.					Date. Week ending.	1864.					1865.				
	Temperature.			Rainfall		Temperature.			Rainfall			Temperature.			Rainfall		Temperature.			Rainfall.	
	Mean max.	Mean min.	Mean.	Ins.	Dec	Mean max.	Mean min.	Mean.	Ins.	Dec		Mean max.	Mean min.	Mean.	Ins.	Dec	Mean max.	Mean min.	Mean	Ins.	Dec
Mar. 8	41·1	32·2	36·7	0	45	52·9	32·2	41·2	1	14	Brought forward	......	......	......	9	61	......	......	......	6	30
" 15	42·8	30·5	36·6	2	44	51·1	28·1	39·6	0	26	June 21	63·0	49·2	56·1	1	35	72·0	42·2	57·1	0	00
" 22	48·1	34·2	41·2	0	80	51·1	27·3	39·2	0	00	" 28	58·7	46·4	52·5	0	41	66·3	48·0	57·1	0	80
" 29	43·7	29·4	36·5	0	36	48·0	27·2	37·6	0	62	July 5	59·1	48·0	53·5	1	15	73·2	46·7	59·9	0	49
April 5	48·5	34·8	41·6	1	24	53·3	34·5	43·9	0	29	" 12	67·8	43·0	55·4	0	00	68·5	48·2	58·4	0	75
" 12	58·1	41·5	49·8	0	27	51·4	39·2	45·3	0	27	" 19	70·5	46·5	58·5	0	00	67·2	47·3	57·1	0	92
" 19	57·7	33·2	45·4	0	64	57·4	35·3	46 3	0	20	" 26	64·0	51·5	57·7	0	58	71·2	46·5	58·8	0	06
" 26	60·5	41·5	51·0	0	05	65·0	37·0	51·0	0	04	Aug. 2	66·5	49·8	58·1	0	98	63·2	48 0	55·6	0	37
May 3	57·4	37·4	47·4	0	80	58·3	36·4	47·3	0	21	" 9	61·2	48 7	54 9	1	26	68·0	49·0	58·1	0	06
" 10	58·7	41·1	49·9	0	06	58·0	40·5	49·3	0	83	" 16	66 5	46·1	56 3	0	00	66·8	48·9	57·8	1	61
" 17	65·2	42·1	53·6	0	69	57·1	42·1	49·6	0	37	" 23	62·2	41·4	51·8	0	03	64·8	47·0	55·9	0	55
" 24	67·5	46·8	57·5	0	54	69·0	44·4	56·7	0	46	" 30	63·1	37·7	50·4	0	32	67·2	46·6	56·9	2	28
" 31	58·0	36·1	47·1	0	16	67·5	47·4	57·4	1	31	Sept. 6	64·7	45·8	55·2	1	81	66·2	50·7	58·4	1	02
June 7	58·3	38·5	48 4	0	61	68·4	48·2	58·3	0	29	" 13	64·7	44·0	54·3	0	93	72·3	53 0	62 6	0	35
" 14	64·2	46·1	55·1	0	50	65·1	44·8	54·9	0	01	" 20	58·7	42 5	50·1	2	67	76·2	49·1	62·6	0	42
											" 27	61·2	44·0	52·6	0	89	65 3	42·8	54 0	0	06
Carry forward...........				9	61	...	...	...	6	30	Total,...	59.5	41·7	50 6	21	99	68·2	42·5	52·9	16.	04

A COMPARISON *of the Rainfall and Number of Wet Days in the Months March to September in 1864, 1865, and the Average of the last Fifteen Years.*

Month.	1864.			1865.			Average of last 15 years.		
	Rainfall.		Wet days.	Rainfall.		Wet days.	Rainfall.		Wet days.
	Ins.	Dec.		Ins.	Dec.		Ins.	Dec.	
March.	4	38	15	2	29	13	2	91	16
April.	1	87	11	0	57	10	2	00	12
May.	2	25	10	3	16	19	2	53	14
June.	2	94	21	1	47	7	3	64	18
July.	2	47	8	2	22	19	3	77	16
Aug.	2	00	11	5	11	17	4	29	17
Sept.	6	08	20	1	24	11	3	21	16
	21	99	96	16	06	96	22	35	109

The observations of temperature were made by Mr. Henry Gibb, gardener to Elias Cathcart, Esq., Auchendrane House, Ayr, and the rainfall by Mr. Thomas Thomson, North Craig, Kilmarnock.

1864 *Experiment.*

There was no March-dust in 1864, and the first opportunity for sowing occurred on the 26th of the month. The field was divided into plots of five ridges in breadth, containing rather more than an acre in each. In order to ascertain whether the soil was uniform, two plots were sown with Finlay oats—one at each side.

No of Plot.	Name of Variety.	From whom Bought.	County Where Grown.	Weight per Bush	When Sown.	Weight Sown, lbs.	Size of Plot Sown.	Rate per acre.		
								lbs	bush	lbs
1	Finlay	Self.	Ayr.	36	Mar. 26	187	1·007	186	5	6
2	Sandy	P. Lawson & Son	Berwick.	44	"	179	1·016	176	4	0
3	Potato	"	"	46	"	208	1·034	196	4	3
4	Black Tartar	"	"	43	"	194	1·068	182	4	10
5	Hopetoun ...	"	East Lothian.	42¼	"	182	1·052	173	4	3
6	Late Angus.	"	Northumberland	44¾	"	223	1·096	204	4	26
7	Finlay	Self.	Ayr.	36	"	199	1·100	181	5	1

The weather for three weeks after sowing was stormy and wet, and vegetation made but little progress. On the 23d of April the brairds were visible; and they appeared thin and washed looking. The latter end of April and the whole of May were warm and forcing, and all the lots came away with great vigour. The Finlay oats had fully the freshest look; the Sandy, Potato, Hopetoun, and Late Angus were much alike; and the Black Tartar was conspicuously broader in the leaf and darker in colour than all the others, and continued so till they came in ear. All the lots were slightly affected by the grub, the Tartar especially. We annually grow a small breadth of Black Tartar, and have frequently found it to be more subject to the attack of the grub than the Finlay. It is not a good tillering oat, and we generally sow it pretty thickly on that account. As soon as the grub was observed, the whole field was harrowed and rolled. The unlooked-for frost in the first week of June affected all the lots to a slight extent—the Potato fully more than the rest. The weather, for nearly a month after the oats came into ear, was unusually fine, and dry enough to prevent over luxuriance. Yet notwithstanding, the squally weather in the first week of August, and again in the beginning of September, twisted and laid some of the lots considerably. The Black Tartar was entirely free from lodging, and the Hopetoun was nearly so; the Potato was most laid. On September 3d the headridges at both ends were shorn, and divisions 2 feet 6 inches wide were cut between the lots, and the produce was carried off. Pits were then made with a spade at the four corners of each lot, and the land was measured after the crop was carried. The Sandy Oats, though ripe on the 4th of September, were not shorn till the 6th, the weather being so stormy and wet. The storm of the 4th September, which did so much damage throughout Scotland generally, by shaking out ripe grain, did not affect us much here. The Sandy Oats alone lost anything, and an estimation of the quantity gave under 1 bushel per acre. All the lots,

Lot.	Name of Variety.	Came in Ear.	Ripe and Reaped.	Carried.	Thrashed.	Size of Plot.	RESULTS CALCULATED PER ACRE.													Total. Grain and Straw.
							GRAIN.									STRAW.				
							Lbs.	Weight per bush	qrs.	bush.	lbs.	Price per qr.	£ s. D.	Light Grain	Chaff.	cwts.	qrs.	Price per cwt.	£ s. D.	£ s. D.
1	Finlay	July 13	Sept. 12	Sept. 28	Dec. 21	·788	2978	36	10	2	26	20s	10 6 9	164	272	35	0	2s 6d	4 7 6	14 14 3
2	Sandy	„ 6	„ 6	„	„ 22	·986	2630	42	7	6	26	23s 6d	9 3 10	151	303	34	1	„	4 5 7	13 9 5
3	Potato.. ...	„ 12	„ 12	„	„ 23	1·004	2951	39⅔	9	2	16	22s	10 4 7	193	237	38	2	„	4 16 3	15 0 10
4	Black Tartar	„ 10	„ 9	„	„ 24	1 032	3038	40	9	3	38	21s 3d	10 1 9	189	261	32	0	2s 3d	3 12 0	13 13 9
5	Hopetoun ...	„ 12	„ 7	„	„ 26	1 024	2943	40½	9	0	27	22s 6d	10 4 5	190	342	32	2	2s 6d	4 1 3	14 5 8
6	Late Angus.	„ 15	„ 22	Oct. 1	„ 27	1·068	2723	39½	8	4	37	22s	9 9 8	159	337	36	2	„	4 11 3	14 0 11
7	Finlay	„ 13	„ 14	Sept. 28	„ 28	1 064	2997	36	10	3	9	20s	10 8 1	147	280	32	2	„	4 1 3	14 9 4

with the exception of No. 1 (see opposite page), were shorn by the same hands; a portion of No. 1 was kept out when making the divisions, as being unfit for experiment.

The year 1864 in Ayrshire was remarkably favourable for the oat crop, and the produce in strong land in the central district was unusually bulky.

1865 *Experiment.*

The produce of 1864 was used for seed in this year's experiment.

No. of Plot.	Name of Variety.	When sown.	Weight sown.	Size of Plot.	Rate per acre sown.		
					Lbs.	Bush.	Lbs.
1	Finlay..........	Mar. 20.	181½	1·007	181	5	1
2	Sandy..........	,,	159	1·016	156	3	30
3	Potato..........	,,	171	1·034	165	4	3
4	Black Tartar..	,,	179½	1·068	168	4	8
5	Hopetoun......	,,	173	1·052	164	4	2
6	Late Angus...	,,	192	1·096	175	4	17
7	Finlay..........	,,	187	1·100	170	4	26

The weather after sowing was dry and warm for the season, and the brairds made their appearance about the 10th of April, being in five days shorter time than last year. On the 28th April they were looking remarkably fresh and healthy. They were very even and thick, and there was no perceptible difference between them, except that the Black Tartar was, as usual, darker in colour and broader of blade than the rest, and it seemed fully the thinnest on the ground. A path 2 feet 6 inches wide was made, in the end of May, along one end of the plots, and similar divisions were run down between them. The breadth left in each was then measured, and another path was made near the other end, so as to enclose exactly an acre in each lot.

Neither frost nor grub affected the experiments this year, and all the lots throve well till the drought in June slackened their pace, and caused the whole to be shorter in the straw than they would otherwise have been. The weather in July was all that could be desired; the Sandy oats were in full ear on the 1st of the month, and the Finlay, Potato, Black Tartar, and Hopetoun came all out about the 5th and 6th, and the Late Angus in a day or so after. August was a wet month, but none of the lots were laid to any extent, and they were all mostly cut with the reaping machine. The whole grain produce was made into meal. The season 1865, in Ayrshire, from seed time to harvest, was perhaps the warmest and driest since 1826, and the oat harvest was one of the earliest, and of the shortest duration, in the memory of the oldest inhabitant. The birr of the reaping machine and the shearers' song were heard almost simultaneously, on the earlier lands near the shore, and far inland on the steep hillsides. The produce on light land was short, on medium land average, and on the clays and late districts unusually large and good in quality.

No. of Plot	Name of Variety.	Ripe and Reaped	Date when Carried.	Date when Thrashed	Size of Plot.	Produce and Value of Grain per acre.									Light Grain Lbs.	Chaff. Lbs	Produce and Value of Oatmeal.						Yield per cent	Produce and Value of Straw.						Total value of Grain and Straw.		
						Lbs	Weight p. bush	Q	B.	Lbs	Price per qr.	£	S.	D.			Loads	Pks	Price p. load.	£	S.	D.		cwts	Qrs	Price p. cwt	£	S.	D.	£	S.	D.
1	Finlay	Aug. 28	Sept. 7	Sept. 22	1 acre	2602	37½	8	5	14	20s 9d	8	19	10	152	282	5	20	32s 6d	8	18	9	59	37	1	2s 6d	4	13	2	13	14	0
2	Sandy	" 22	" 7	" 22	"	2456	42	7	2	20	24s	8	15	6	105	306	5	31¼	32s	9	5	2	66	39	2	"	4	18	4	13	18	10
3	Potato	" 29	" 8	" 23	"	2493	40	7	6	13	22s 3d	8	13	4	145	230	5	18	32s	8	14	5	61	37	1	"	4	13	2	13	6	6
4	Black Tartar	" 26	" 7	" 23	"	2923	39	9	2	37	20s 6d	9	12	1	120	289	6	12	31s	9	15	4	60	32	3	2s 3d	3	13	8	13	5	9
5	Hopetoun ..	" 26	" 7	" 25	"	2631	41	8	0	7	22s 9d	9	2	6	105	306	5	34	32s 3d	9	8	8	62	32	1	2s 6d	4	0	8	13	3	2
6	Late Angus	" 30	" 8	" 25	"	2389	39	7	5	10	21s 6d	8	4	7	112	292	5	8	32s	8	6	4	61	36	1	"	4	10	8	12	15	3
7	Finlay	" 28	" 8	" 26	"	2720	37½	9	0	20	20s 9d	9	8	1	130	305	5	30¾	32s 6d	9	7	8	59	35	1	"	4	8	2	13	16	3

Samples of the oats in both years, and of the oatmeal in 1865, were sent, properly labelled, to an experienced grain-dealer, who affixed the relative values as given in the tables. It was thought advisable, instead of taking the current prices, to take for a basis Finlay oats of 36 lbs. per bushel, at 20s. per quarter, which is pretty nearly the average price since the lowering of rates after the Crimean war. The straw is put at 50s. per ton, which may be about the average price in this district. The Tartarian, being inferior, is valued at 5s. less.

Although the Finlay oat has not given the highest money return in both years, it must be remembered that neither season was an average one, and we should like to see further trials made before condemning an oat which the united experience of many years had sanctioned as the best for this district. Our summer temperature is slightly colder than any of the eastern counties, and we have a greater rainfall, particularly in harvest, than they have; and the Finlay oat neither sprouts readily nor is easily shaken out by the wind. We put a high value on good oat straw for our dairy stock, and the straw of the Finlay oat is sweet and succulent; and we mill a large proportion of our oats, both for the sake of the "brocks" for our milch cows, and for the high-class oatmeal which the Finlay oat yields. The Hopetoun oat appears to be a first-rate short oat, and is deserving of our attention; the oatmeal from it was nearly as good as that from the Finlay. The straw was prime quality, and the crop did not lodge readily. The Black Tartar was stiff-strawed; and should be suitable for soft mossy soils where the temperature is not too low. Its grain makes excellent "horse-corn," but it usually fetches 1s. per quarter less in the market than white varieties of the same weight. Special machinery is required to take out all the black ticks from its oatmeal; and its straw is almost valueless for fodder. The Potato oat is a long-approved variety, and seems suitable for light lands near the sea. The Sandy oat, being very early, should suit sheltered spots in late districts. The Late Angus is much too late for us in average years.

A deputation from the Highland Society inspected the crops twice in each year, saw that the divisions were properly made, that the seed was true to its kind, and checked the measurements of the plots.

IMPROVED THRASHING MACHINE.

On an application by Mr. Peter M'Lellan, Millwright, Abernethy, Perthshire, the Directors of the Highland and Agricultural Society appointed a committee to inspect and report on certain improvements, represented by him as having been effected on the Thrashing Machine. The Committee, consisting of Mr. Henderson of Gattaway; Mr. Gorrie, Innerdunning; Mr. Drummond, Mains of Cultmalundie; and Mr. Alexander Slight, the Society's Curator of Machinery, having met at the farm of Wester Cultmalundie, near Perth, where the machine is erected, submitted the following report to the Secretary:—

WESTER CULTMALUNDIE, *7th December*, 1865.

SIR,—The Committee appointed to inspect Mr. M'Lellan's improvements on the Thrashing mill, having met here to-day and carefully examined the machine, and the work performed, find that the combination of the Scotch and English drums in the same machine is a decided advantage for thrashing different kinds of grain:

Barley was thrashed equally well by each drum.

Wheat was best cleaned by the rubbing drum without breaking the straw.

Oats were better thrashed out by the beater drum than by the rubbing system.

Beans and peas require to be thrashed out by the beater drum, as the rubbing drum does not suit so well for them.

The vibrating shakers which were exhibited at the Edinburgh Show, but could not be well judged of there, were here seen to great advantage in actual work; they are a decided improvement. The Committee think this the best shaker in use.

The two dressing fans in one frame make a very compact arrangement, and work in a very satisfactory manner; these fans have only two blades, and the wind is quite regular, and the power absorbed less than when more blades are used. The grain passes from the first or mill fanners to the lower dressing fan, from which it is carried, either directly or through the hummeller, by an *elevator to the third or upper fan*, and passes off fit for market.

The machine is well got up and well finished, and did its work admirably, and the Committee have every confidence in recommending it to the special notice of the Directors.

The Committee suggest that a drawing of the mill, with a short description, should be published in the Society's "Transactions."

We are, Sir,
Your obedient servants,
(Signed) DAVID HENDERSON.
JOHN GORRIE.
JAMES DRUMMOND.
ALEXR. SLIGHT.

John Hall Maxwell, Esq., C.B.

A premium of £10 was awarded by the Directors, and under their instructions Mr. Slight has since prepared the following explanatory statements and relative illustrations:—

IMPROVEMENTS ON THE THRASHING MACHINE BY MR. PETER M'LELLAN, ABERNETHY, PERTHSHIRE.

The improvements introduced by Mr. Peter M'Lellan on the fixed thrashing machine consist in the application of both a rubbing and a beating drum, either of which may be used as required; a new construction of shaker; and an improved arrangement of fanners and hummeller.

The general arrangement of the machine is shown in section in fig. 1, in which (*a*) represents the beating drum, fitted with feeding rollers, table, and cover in the usual way. It is of the ordinary construction—32 inches diameter, and 4 feet 6 inches wide, fitted with four serrated beaters and fluted cover. Like the common beating drum it strikes upward, and delivers the *straw and grain to a revolving shaker. When it is in action* the other drum is stationary, the belt which drives it being removed. The rubbing drum (*b*) is similar to the ordinary drum of the English thrashing machines. It is 22 inches in diameter, and 4 feet 6 inches wide, fitted with eight beaters or rubbers; its motion is contrary to that of the other drum, so as to deliver the straw to the revolving shaker at the same point as the other. It is fitted with a concave (*c*) formed of iron rods and bars, as used in the English machine, and is fed from above by means of a hopper and feeding table (*d*). When this drum is used the other is thrown out of gear, and a loose board (*e*) is temporarily inserted between the two drums to conduct the straw to the shaker and prevent any grain being lodged about the beating drum. The revolving shaker (*f*) is of the ordinary construction—6 feet diameter, consisting of six rakes with iron teeth, and having underneath a concave of iron rods. The improved shaker is placed immediately at the end of this concave. It consists of five vibrating bars or shakers (*g h*) 9 feet long, rising towards the end of the mill where the straw is delivered. They are each supported at the extreme end by a bent spring (*i*) formed of stout hoop iron, and at the lower end, when at rest, by a cross bar, with guides to steady them. A shaft (*j*) underneath these shakers carries five double cams of wood so placed that in their revolution they successively lift the shakers through a height of three inches, and their motion is sufficiently rapid to give a quick vibratory motion to the shakers, which, when communicated to the straw, effectually separates any grain which may be hanging among it. To facilitate this separation each shaker is made with three raised ribs running the whole length, and forming channels for the downward passage of the grain, as shown in the enlarged cross section, fig. 2; the bottoms of these passages are pierced with holes to allow the grain to fall through as soon as it leaves the straw, to the fixed bottom (*k*), which conducts it to the fanner. To give a forward motion to the straw, a series of rake heads, six in number, are made to move along underneath the shakers, with teeth projecting upwards through the spaces between them; these teeth catch hold of the straw and move it along while it is being subjected to the vibratory motion of the shakers. The rakes are attached to pitched chains at each side of the machine, passing over wheels on the cam shaft (*j*) and the shaft (*l*), and supported by the intermediate shaft and wheels (*m*). The bottom (*k*) of the shaker is composed of a series of ridges and hollows to cause the grain to pass down the hollows, and it is prevented lodging in them by the return motion of the rakes, the teeth of which rest in the hollows, and carry everything before them to the lower end. To prevent wear, these hollows are lined with iron in the bottom. The grain, when it leaves the shakers, is received by a vibrating shoe (*n*), about 7½ feet in length, above the fanner, embracing the concave of the revolving shaker, and the lower end of the fixed shaker. This shoe has a solid bottom to carry forward the grain, with the exception of about three feet in length over the first or mill fanner (*o*), where it is formed into a coarse riddle to separate the grain and chaff from any broken straw which may have passed through the shakers. The mill fanner, as usual, separates the chaff from the grain, which then passes to the second fanner (*p*), where it is more effectually cleaned, and where it passes to a hummeller (*q*), from which it is delivered to an elevator, or, if not requiring hummelling, it passes direct from the fanner to the elevator, which lifts it to the upper or finishing fanner (*r*), fitted with riddles, where the light is separated from the heavy grain, and the latter delivered into a sack ready for the market. This arrangement of the fanners is exceedingly compact, and appears to answer its purpose perfectly. In the construction of the fanners, the principal novelty is in the fans of the two finishing fanners, which are each made with only two blades, fixed to a single arm of wood in the middle; this, while it gives a sufficient and perfectly steady blast, materially simplifies the construction of the case, which is made in one piece—the openings in the body of the fanner and at the centre being sufficient for putting in or taking out the fan blades and their axle.

FIGURE 1.

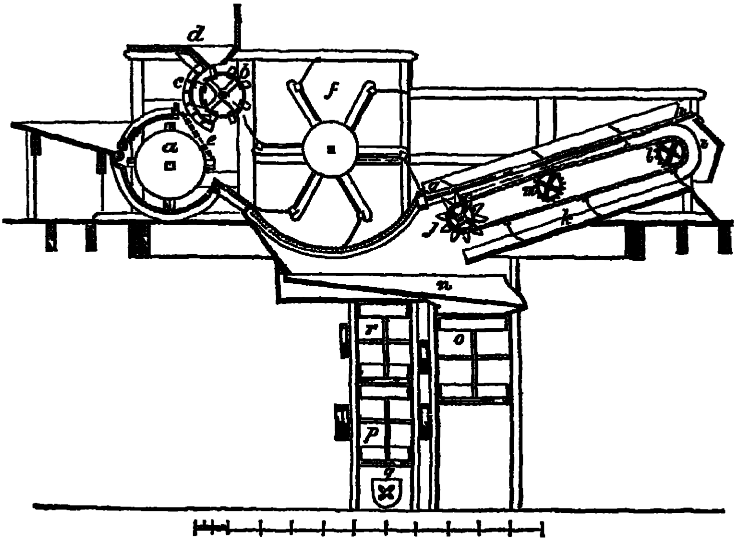
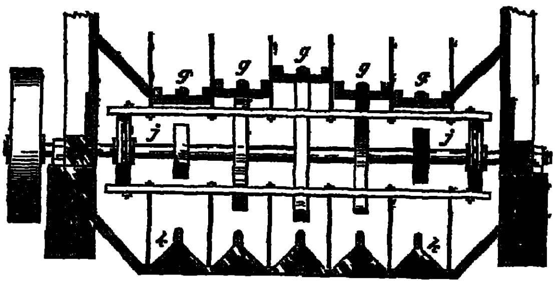


FIGURE 2.



ON TRANSPLANTING TREES.

By Robert Hutchison, of Carlowrie, Kirkliston.

[*Premium—Medium Gold Medal.*]

There is probably no department of estate management less attended to than the transplanting of large trees and shrubs. When occasion requires the removal of any large specimen for immediate effect, the operation is unfortunately too frequently performed with little regard to the general principles of phytology, far less with any special care for the individual requirements of the species. Hence it is that many failures result; and the hopes of the planter are so disappointed that in future, when similar operations are necessary, recourse is had to trees and shrubs of much smaller size. Indeed, the comparative cost and risk of removing large plants is generally considered to be so much out of proportion to the expense of lifting younger specimens, that, now-a-days, it is the exception to find proprietors removing or transplanting very large-sized trees or shrubs. Preference is given to plants of small dimensions; and seeing the ignorance so often displayed by those to whom the superintendence of this operation is intrusted, and their heedlessness of all laws of nature, this is not to be wondered at. Yet true it is that the operation may be performed with almost equal certainty, in the case of large trees, as in that of small ones, provided care be taken, and due attention be given to the habits and peculiarities of the subject—to the proper season and circumstances at the time, as well as to the nature of the soil and situation.

In considering the question of transplanting, and for the purpose of this paper, applying or rather restricting that term to large-sized plants only—probably not under three feet, and ranging up to forty feet in height—we shall first notice *the season and circumstances best suited for the various species.*

The habits of the different varieties of trees and shrubs are so various, that the same season or the same age will hardly suit any two of them for transplantation. As a general rule, however, we may state that the process may be carried on with safety and success, at the time which will least interfere with the functions of nature in the individual species. Probably, about a month or six weeks before the sap begins to descend (provided the weather be favourable), in the case of coniferæ and evergreen shrubs; and as regards deciduous trees, as soon as the leaves have performed their functions, and have completely withered up, or been shed by the branches. So far as our personal experience of the newer coniferæ goes, we have found that they should never be transplanted till the month of April has gone, and that about the middle of May is the best season for transplanting most of the species. Small plants, if it is intended to grow specimen trees, should be preferred—and they will do best if from three to four feet, or not over six feet high—unless, when taller, they have been previously several times removed. We have repeatedly observed that evergreens will thrive best if transplanted during cloudy weather, at Midsummer; or all the above-mentioned classes may with much certainty be transplanted about the end of September, or early part of October. In lifting deciduous forest trees, it is well to observe the different orders in which the varieties come into leaf in spring in the locality where the operation is to be conducted, and to follow that order with the various varieties when the proper season for transplanting them arrives.

One law of nature too frequently overlooked should regulate, to a great extent, in each locality or situation, the season for transplanting, viz., *the alternations of temperature in the soil*, in relation to *the temperature of the atmosphere.* The discrepancy between these gives decided preference to the Autumn months over those of Spring for general transplanting operations. In this climate, for example, when hard frost has prevailed for a time, which is often the case in the months of January and February, we usually receive a considerable and continuous fall of rain, which chills and soaks the soil, and upon stiff land renders all attempts at trenching and digging (which should invariably precede transplantation) worse than useless. Therefore, March and April are, in our opinion, the worst months in the year for conducting the operation, for not only are the cutting frosty winds at that time very injurious to newly moved specimens—especially to coniferae and evergreens—but, if planted at that season, they are placed in soil quite unprepared for them; and the dry season succeeding, draws off all moisture necessary to induce the growth of young rootlets, or cakes the already saturated clay soil around the tender spongeoles, drying up their cells, and withering the very mainstays of the plant's existence. Whereas, if advantage be taken of fine weather, during March and April, to dig and pulverize the soil intended to receive the transplanted specimen, the stirred earth, open and free, absorbs the heat of the sun's rays, which, by the end of April, have begun to possess power; and by proceeding with the operations in May, a much milder temperature exists in the root-bed of the plant, and thus a more rapid propulsion of young rootlets is induced. At this period of the year, the various species of Abies, Pinus, Cedrus, Cupressus, Juniperus, and evergreen shrubs generally, may most advantageously and successfully be moved; and, with ordinary precautions, success must follow attempts to lift plants of most of these classes of large size, say, from six to ten feet in height, or even taller specimens.

We have said that a very suitable season of the year for transplanting is towards the end of September, and the early part of the month of October. The temperature of the soil is, a that period of the year, in this climate, probably nearer in degree to that of the atmosphere than it is at any other season. At two feet under the surface, about this time, the mean temperature of the soil will be from 55° to 52°, while that of the atmosphere will average in ordinary seasons from about 55° to 48°. The soil being thus warm, and closely approximating the mean temperature of the outer air, any injury from rupture, or cutting, which the rootlets may have accidentally sustained in removal is quickly repaired, and the formation of new spongeoles is more rapidly promoted than it would be in the spring months, when the temperature of the soil would have fallen, in ordinary cases, to about 37° or 40°, at which time the temporary check sustained by the roots would prove more serious—occurring, as it would, at the very season when their full progressive development is most essential to the welfare of the tree. For these reasons, we prefer transplanting deciduous trees in Autumn, and coniferae and evergreen shrubs in May, or at Midsummer.

The successful transplanting of large trees and shrubs depends not only on the season selected for the operation, the situation of the plant may greatly aid in the favourable result, the nature of the soil may also tend to ensure success; and the choice of subject upon which to operate is probably not the least important consideration in the matter. No tree should be chosen for transplanting from a plantation or thicket, for there the roots of the crowded denizens have so interlaced with one another that it is absolutely impossible to detach and clear the root-ball of any tree without inflicting considerable injury either upon itself or on the feeders of its neighbours. Nor do specimens taken from such positions afterwards form handsome plants, and they, moreover, incur the risk of suffering materially from the change of site. In thicket the tree has been accustomed to a more regular and a milder temperature than it can experience in an isolated position. The alternations of temperature in the soil have hitherto been to it less excessive and extreme, and it has been unused to the vicissitudes of climate to which, in its new situation, it is exposed. Next to the selection of a tree for the purpose of transplantation from an open position, we recommend that choice should be made of good specimens from the margin of woodlands, or from trees growing in narrow strips of belting.

As regards soil, a strong retentive loam, tending to clay, will yield the best root-ball, and will ensure the exclusion of air from the numerons fibres encased in it during the progress of removal; but, on the other hand, such root-ball placed in free light soil, or in earth of a lighter nature than itself, is too apt to become dry and caked, its natural moisture being drained off by the change of site. Hence, while a light sandy soil will hardly afford facilities for removing specimens without very great care, and the use of machinery being necessary to hold the ball together, we would almost prefer it to a clayey loam, if the tree grown in it is to be removed to a light porous soil in its new position. These difficulties, however, as we shall afterwards shew, may, by treatment at the time of removal, be overcome, or very much modified.

The choice of a proper subject to operate upon, is another requisite to success in transplanting.

Tall, slender "drawn up" plants should be avoided, and also such as are of flat-headed and wide-branching habit. The head of the tree is the best index to its roots; and the two extremities will generally be found to be in proportion to each other. A light well-branched top should be preferred, and due attention must be given to the choice of a clean and particularly healthy bark. Foulness, or moss covering the trunk, or inequalities of texture and appearance of the bark, are, in a tree, no less certain indications of a more or less diseased state of rootlets, or of some inherent weakness in the constitution, than are blotches and eruptions on the skin of the human species proofs of impurity of blood. A careful survey of the general dimensions of the head of the tree is likewise a very good criterion for ascertaining the probable dimensions of the earth-ball requisite to be removed with the plant; and, consequently, if the specimen be a large one, of the cost of labour, and probable expense attending its removal.

In an ordinary average soil, the general proportion of the spread of the principal fibrous roots necessary to the tree's existence, is about two-thirds of the diameter of the branches in the case of sapling trees of about twenty to thirty feet in height. When the stem has become thicker, and the whole tree has assumed a more "set" or mature appearance and habit, and in the case of old timber trees, the rootlets will be found at a much greater distance from the trunk; and it is in this respect that the chief difficulty and danger lies in removing old trees. The principal feeding rootlets in such subjects are chiefly situated at a considerable distance even beyond the spread of the branches, and, as it would be impossible to remove the tree with a rootball enveloping these necessary auxiliaries, they must be severed from the tree, and thus many of its giant underground limbs must be cut; and, although many fibrous rootlets may still remain, the balance of power between head and root is lost for ever, so that in its new situation the old tree like an old man, who has undergone the amputation of his limbs, cannot be expected to recover from such severe treatment, or to have the same chance of surviving as a younger and more robust subject; while in addition to the loss of many of those organs, which served the tree as the absorbents of moisture and nourishment, deprived of its chief moorings, how can it be expected to withstand, erect and unscathed, the storms of winter?

The methods usually employed in transplanting are various, and differ according to the nature of place and circumstances, as well as to the end in view. They may, however, be classed under two separate and distinct heads:—

1. Horticultural Transplanting.
2. Arboricultural Transplanting.

The former has reference, and is applicable only to small trees or shrubs, and the usual modes of conducting operations in this case, are so well known and understood, as to render it unnecessary for the present to occupy time in relating them. The latter system, on the other hand, and the proper modes of performing operations under it, require considerable notice, and this branch of the subject includes the discussion of the successful manner of removing heavy and large plants. Indeed, it is a branch of rural economy, in itself a complete and distinct art, requiring much care and foresight, as well as an accurate knowledge of the physiological peculiarities of the species, and also some considerable skill in landscape gardening, not only to insure its successful accomplishment, but to obtain such results as the increased expense involved by the process warrant the operator to expect. In prosecuting it in the case of heavy specimens, the aid of machinery is indispensibly requisite, and, where unusually large trees are for special reasons desired to be removed, considerable risk and expense are incurred—more so, probably, than the ultimate advantages justify.

Passing over, therefore, the consideration of horticultural transplantation, or the removal of merely transplanted seedlings, such as are commonly used in forming young plantations, as beyond the province and purposes of this paper, we shall, in further detailing the methods employed, and the precautionary measures necessary to ensure success in transplanting, specify these merely as regards plants of some attained height, from about three or four feet and upwards, or rare and valuable specimens of recently introduced coniferæ, or evergreen shrubs. In the case of many of these new pines, early transplantation is productive of much ultimate advantage to the habit of several of the varieties in this climate, either by checking undue growth, or promoting the formation of strongly-fibred roots.

It is customary, before removing a large hard wood tree, to subject it to a system of preparation. This has been found very beneficial, and we think it indispensible to the success of the process of transplantation. Usually in the autumn, prior to the season in which the tree is to be lifted, or in the previous spring if the operation is to be conducted in autumn, a trench of about two feet in breadth is dug, about six feet in diameter (if the tree be not more than twelve feet in height) around the stem, care being taken, when the pit has been formed to a depth of two feet under the surface of the ground, to slope it inwards on all sides towards the trunk, so as to undermine the root-ball, and the numerous rootlets and fibres. Into this trench a supply of well-rotted turf, previously mixed and amalgamated with lime, is thrown and firmly beat in towards the roots. By this adventitious application, a fast and free propulsion of young roots is induced, and the task of removing is very much lightened when the period arrives for executing it.

Another mode of preparation is, however, even better adapted for attaining the end in view. By the method already described, injury is frequently done by injudiciously trenching too near the root, and this is sometimes more serious than the transplanting process itself. Instead, therefore, of cutting the roots all round the plant at once, we recommend in the autumn of one season to dig round them on one side of the tree only, and to fill in the compost referred to; and in the following autumn to dig similarly round those on the other side, thus completing the trenching process, and in the succeeding season the removal of the tree may be proceeded with. In this way a gradual and less severe interference is attempted, and the system of the tree is permitted to recover from each successive curtailment of root, prior to its final transportation to a new site.

Care is to be taken in removing a tree thus "prepared," not to dig the root-ball *within* the line of the trench, but *outside* of it, so as to include the freshly added soil, and if it be deemed desirable to lighten the ball, any loose earth should merely be picked away, a part of the operation which must be abandoned as soon as the points of the rootlets are seen protruding.

In transplanting, the first care of the workmen is to dig a trench around the plant at a radius of not less than six feet from the stem. Having done so to a depth of about two feet to two feet and a half, the points of the spades may be directed inwards towards the root of the tree, and having thus disengaged the plant from its moorings, it may be carefully lifted, if the distance be short, to its new position.

Should the ball be composed of such earth as is apt to crack or break away, it should, before being lifted out of the trench, be properly secured by boards roughly nailed around it, after having been carefully tied together and sewn up in matting, and damped.

Too much attention cannot be paid to the protection, as much as possible, of the young roots from the influence of the atmosphere; and, consequently, to save unnecessary exposure, the pit intended for the reception of the plant should be previously dug and prepared for it. If the weather be dry and favourable, we do not object to this having been done, and the earth thrown up to pulverize under the action of the air for a couple of weeks prior to the operation of transplanting.

Before placing the root-ball into the pit, a little *dry*, fine soil should first be thrown into the hole, and if the situation be very low, or the soil heavy, it is a decided advantage to have the immediate spot well drained by means of small loose stones, or coarse gravel, laid in narrow slits radiating from the pit to a distance of about three yards, deepening such little runlets for superabundant moisture at the extremities to at least a foot below the level of the bottom of the pit. By these channels the root-bed is rendered less liable to root-damp, the great obstacle to the success of newly transplanted trees, which is frequently originated by hard tramping, and over-watering at the time of removal.

Having thus placed the tree in the site, the soil is next cautiously filled in to the hole, care being taken to firm it well; but, in doing so, it is especially requisite to avoid lacerating the small roots, and when the earth is all filled in, there should be formed around the neck of the tree a trough or hollow, to prevent the operation of watering from washing away the soil, and thus exposing the rootlets near the surface of the ground.

In planting the tree in its new situation, it is sometimes customary to reverse its position, if it happens to have a weather side, or an unequally balanced head, and to turn towards the stormiest point, the side of the tree best furnished with branches. In this way the habit of the plant to turn its branches from the wind is corrected, and its future appearance improved. Where much inequality exists, or where long limbs predominate too much, a little judicious pruning may be also desirable. In no case do we advocate root-pruning in transplanting deciduous or other trees.

In the manner thus indicated, specimens from about three to six and eight feet in height are removed without the aid of machinery; but where a good root-ball cannot be obtained, a transplanting apparatus should be employed; and, when this is necessary, we have found the 30-inch transplanter, patented by M'Glashan of Edinburgh, both efficient, easily wrought, and economical.

The same general rule is applicable to all methods of transplanting, whether by manual labour or by machine, namely:—to disturb the functions of nature as little as possible, and when disturbed to provide for the injury a speedy remedy. Thus very large plants may be transported any distance with perfect safety. When the operation is conducted by manual labour only, and a considerable distance has to be traversed to the new site, we have found it best to place the specimen upon a handbarrow, and to have the same borne by two or more labourers, seated in a spring-cart, and, in this way, neither the jolting of the springs nor the rough unevenness of the road affect the stability of the root-ball. When placed in its new position, it is well to have the pit somewhat larger than necessary, and into the vacant space around the ball to pack closely a quantity of fresh mould, composed of well-rotted turf mixed with leaf-mould; and, after one good drenching of water, the tree may be left to its fate.

Should very dry weather supervene, it may be necessary to add more water. Yet this is rarely requisite; and we think that mischief is too often done by frequent repetitions of watering. In administering the thorough soaking when planted, it is best to apply the water *overhead*—that is, upon the leaves and foliage of the tree, and not merely to pour it into the roots. By this precaution, the invariable tendency to profuse perspiration which the leaves of a transplanted tree exhibit, is prevented or modified, and, consequently, any undue drain upon the system of the tree from that cause is obviated. To aid the success of transplanting, it is almost unnecessary to add that the operation should only be conducted in dull or cloudy weather.

Security against the swaying of the plant from the action of wind is the only other precautionary measure subsequent to planting, requiring notice in this paper.

As soon as removed, all specimens should be firmly secured against the sudden attacks of gusty weather. Generally speaking, in the case of large trees, the root-ball will be found a sheet-anchor of sufficient weight (if the tree has been properly lifted) to cope with the violence of the elements.

It is well, however, to moor small or tender trees by stakes well driven into the ground, probably to a depth of three feet, or by ropes or strand-wires fastened to stakes driven into the soil around the root. Another method sometimes employed to secure steadiness of the tree in its new position, is, in transplanting, to splice to its leading roots long pieces of tree-roots, from fifteen to twenty feet long and about two inches diameter, cut from other trees—thus the lever power, and resistance of the roots against the swaying of the head by the wind, is greatly increased, until the tree takes hold of the soil for itself, and becomes thoroughly established in its new site.

In cases where ornamental shrubs or trees are planted, with the prospect of being again, at no distant date, transplanted, it would be well to proceed thus:—Having dug the pit for the reception of the tree, drive four stobs into the ground to the head, one at each corner of the hole; to these four corner posts nail strong boards of common fir planking, one inch thick and six broad, or of paling rail, leaving narrow openings between the joints; in this underground frame-work the tree will expand and spread its roots, and when the time arrives for transplanting, a trench is dug round the wooden casing; the four corner posts or stobs are sawn over at the bottom; a flat shovel or spade is used to skim under the root-ball, for the purpose of cutting the downward rootlets; a rope is passed from either side under the casing, and fastened to the tree stem above, so as to keep the whole firm; and in this way, and with little expense and trouble, the plant may be transferred to its new position. This mode of transplanting has this advantage, that the delay and cost of previous preparation is avoided, time and labour are saved during the operation itself, and a certainty of success is, in ordinary circumstances, ensured. It may be prosecuted in ornamental grounds, where, at the time of laying out, it is quite obvious that in a few years many of the specimens planted will require to be removed or sacrificed, to leave room for the others.

We may notice, in passing, the ingenious but old-fashioned mode of freezing the earth around the roots for the purpose of obtaining a good retentive root-ball, but we do not recommend it. It necessitates the partial exposure of the rootlets to the weather at its most inclement season, till sufficiently hard frost sets in, and the season for the removal is limited to a period of severe frost; and although, from the process of freezing the mass of earth round the roots, these organs may sustain no injury, still the whole method is obviously clumsy, and the foregoing objections are sufficiently strong to condemn the process at the present day.

Many practical results are within our knowledge to justify the seasons and circumstances for transplantation advocated in this paper. We may observe, as instancing between the comparative advantages of Autumn and Spring, or early Summer planting, the following example, amongst many others, in favour of the latter season for evergreens.

At C———, soil rich loam of considerable depth, on a rather damp clayey subsoil; elevation above sea level 90 feet; in the month of November 1856, a thick belting of evergreens, chiefly Portugal laurels, bays, hollies, yews, &c., was formed. The plants were about 2½ feet to 3½ feet high, and were carefully "pitted" in the usual way. A moderately severe winter ensued, and the losses by next April were from 40 to 50 per cent. This arose not so much from the severity of the frost, as from the influence of the chilling east winds of Spring in February, March, and April, succeeding a considerable period of wet weather, acting upon the plants before they had become established in their new site. The blanks thus created were made up in the Spring of 1858, from the same nursery stock, and in the same manner as before, but at the beginning of May instead of in the Autumn; and the consequence was, that not only was there no case of failure, but these last removed plants are now much taller and stronger specimens than the survivors of the previous year's planting.

To notice the advantageous results of midsummer transplanting, we need only refer to the trees removed during the summer of 1863, at Goldenacres Nurseries, to test and exhibit the power and advantage of M'Glashen's Patent Transplanting Apparatus, and which at this date (October, 1865) are all very healthy and thriving. These trees are chiefly Coniferæ, and ornamental oaks, such as Quercus Panonica, Salicifolia, Pterifolia, &c., and ranged from about four feet to eleven feet in height when removed. The operations of transplanting them were carried out during June, July, and August, 1863, and not only had none of the plants lifted sustained any injury, but even in the following spring, and ever since, they have gone on producing vigorous shoots of young wood; several thorns removed having, in 1864, made growths of about three and a half feet in length!

Before concluding this paper, we have to notice the comparative advantages in point of cost, progress, &c. of transplanting trees from three to six feet high, instead of the larger specimens usually removed for purposes of immediate effect. When permanent results are desired, and value as well as amenity has to be added to the estate by the growth of healthy timber, there can be no doubt that the advantage is in favour of the smaller specimens. It may, no doubt, be desirable to clothe with rich foliage the barren landscape, or afford protection to weather-beaten flocks and herds, by calling into immediate existence the sheltering belt; and where the subjects can be procured, to be thinned out, or where clumps are to be found to draw from, the practice of removing large trees may be adopted with benefit and success, at no very extravagant expense; and thus enhanced value may be given at once to bare pasture lands; but the art must ever be limited, and it is not in the case of large trees applicable to the general purposes of utility. It may be argued in favour of the economy of the practice of removing large specimens, that extensive tracts of ground usually occupied by young trees and nurses may be saved for other purposes, that the expenses of fencing and of maintaining plantations during years of unprofitableness, and of cleaning, thinning, and pruning may be avoided, if trees of larger growth were more generally transplanted than those usually employed, and that the difficulty of raising in some unsuitable localities and soils several of the slow-growing varieties during their tender years would be avoided ; but in opposition to such specious arguments we can only remark that, while for immediate landscape effect, *and for that only*, the larger the tree removed the better, provided it be done successfully, and be not transplanted to its new site in a mutilated condition to pine and decay ; and such means must be employed by those who desire to anticipate years of growth and progress to attain their object,—still their pleasure must be dearly bought at the price it costs, and the risks of failures they incur for a few years of merely temporary advantage. On the other hand, those who are satisfied with transplanting for the purpose of immediate effect, specimens of from three to eight feet high, will be more amply rewarded, for at much less cost and trouble, and with prospects of greater certainty of success, they obtain a far more rapid and healthy growth of young wood, as well as a more enduring superiority of timber; and they consequently bequeath to their posterity a richer and more valuable gift, in the *more permanently improved* and enhanced value of their property.

ON THE SILVER ALDER:
ITS VALUE AND IMPORTANCE AS A NURSE-PLANT TO OAK.

By Ralph Carr, Hedgeley, Alnwick.

From the river Humber northward, along the eastern side of Great Britain, nothing perhaps is more needed than the acquisition of a hardy deciduous tree, that will grow freely from the first in narrow exposed plantations, and yet will not run up to too great a height, and lose its lower branches, as the birch is so apt to do.

When this happens, and the tree has also lost its balance, and heels over from the prevalent wind, it becomes worse than useless. It allows the bitter blast to penetrate beneath with unmitigated rigour, whilst it overhangs or lashes the nearest trees, or overshadows the fence or the adjoining land.

The birch, therefore, has, notwithstanding its great beauty when well placed, many serious faults as a nurse-plant in small plantations in the open plain, and for the same reasons it cannot be depended on for shelter to adjoining fields.

It is in its place in woodlands enjoying the advantage of sloping or of undulating ground, in river-valleys, in dens, and on mountain-sides, but not on the plain, unless in extensive woodlands, and sheltered from the wind.

Neither is the birch a reproductive plant, whether from the base or from seed, except in a small degree, and on slopes or on favourable soils where it is perfectly at home.

The common alder, indeed, is on certain soils an excellent nurse-plant and tree of shelter for narrow plantations on the plain. It grows very quickly in youth; it does not become too high, maintains a good clothing of lower branches, and is not liable to be thrown out of its balance. On the contrary, it stands well up to the wind; and I do not attribute any weight to the supposition that its roots tend to retain moisture and create swampy ground. Long experience and extensive observation as an arboriculturist, assure me that this apprehension is chimerical, unless we plant the alder close to a spring, and allow it to obstruct the outlet, when a birch would have much the same effect.

In narrow plantations a contrary evil is that which constantly supervenes. After a very few years the soil becomes so dry and so much exhausted from the wind sweeping through it, and carrying away all the fallen leaves which ought to lie and rot upon the ground annually, that every kind of tree suffers from want of humidity.

If the alder could retain humidity in such plantations, upon any soil, it would be invaluable, but it is incapable of doing so. And the objection to the common alder as a tree of shelter in small exposed plantations, and in the somewhat dry climate of the cultivated country, is, that it is short-lived, and dies out suddenly when twenty or thirty years old, leaving no young offspring to succeed it. It cannot bear our scourging winds in Northern Britain, unless favoured by moist soil to supply the loss by evaporation, though, curiously enough, it thrives well under the hot sun of Kent, Surrey, and Hampshire, even on poor dry parts of the Weald, and affords excellent coppice; but then, vegetation there of every kind is greatly more vigorous than with us. The earth is warmed to a much greater depth by the sun's rays; and semi-aquatic plants, like the alder, can compensate to themselves for the greater heat by sending down their roots into a lower stratum.

But if the common British Alder, *alnus glutinosa*, cannot be depended on as a long-lived and reproductive plant, in plantations, for shelter upon inferior soils on our north-eastern side of the Island, there is another alder which will be found to compensate for the shortcomings of our native species, and this will be a really valuable acquisition to any planter who will take the trouble to propagate it; for, happily, he may soon make himself independent of the uncertain supply of this excellent nurse-plant in the nurseries. The Silver Alder, otherwise called the hoary and the Elm-leafed Alder, *alnus incana*, grows even quicker than the common species upon damp or on stubborn clay soils; and not only so, but in five or six years it begins to throw up a number of offsets or suckers, from which any number of young trees may gradually be obtained. These are not mere collar-shoots, such as spring from the base of the common alder, but true offsets, rising at the distance of some feet from the parent plant. And if the latter be cut down to make way for an oak or other principal tree beside it, the young under-growth is ready to form a bush of rods resembling those of hazel, where it stood.

But the silver alder, in its native countries of Sweden, Eastern Germany, the Carpathians, and the Tyrol, is by no means confined to humid or heavy soils. In the Tyrol, where I have examined its distribution and habitats, over a great extent of hill-sides, valleys, and flat mountain pasturages (as also in the Canton of Uri in Switzerland), it often covers vast knolls and hill-flanks of ancient gravel and sand, now lifted up by subterranean forces far out of the reach of the existing rivers. Its power of propagation by offsets, as well as by seed, enables it to cover the surface closely with a coppice very like that of hazel, and to keep both parching sun and withering frost from the ground. Nevertheless, it prefers the coldest and bleakest parts of the valley-heads, running up as high as the birch would do towards the snow-line. At last it is replaced by *alnus viridis*, the green or unhoary elder, which closely resembles it however in foliage, but approximates in flower and fructification to the birch, and is a mere low shrub. This last runs up to the snow-line itself after thus replacing *alnus incana*, just as the dwarf birch, *betula nana*, replaces on our own mountains the common birch near the summits.

Having observed the valuable properties of *alnus incana*, and above all its habit of throwing up offsets, about twenty-five years ago I began to insert the species, wherever I had a vacancy, in my own plantations in Northumberland, near the Cheviots. It grew with remarkable vigour, making always long shoots the second summer after being planted. No frost affects it, for its wood is ripened in autumn, earlier a good deal than the shoots of the common alder. Nor does the coldest spring do it any harm. It comes into leaf with the birch, and is intermediate in general appearance between the birch and the common alder, having a graceful foliage, hoary on the under side, and a shining bark of metallic gloss like that of the young mountain ash.

No tree stands up better to the west wind, and it shares with the common alder the properties which make both such excellent neighbours to the oak, namely, that it rarely exceeds twenty-five feet in height, and, instead of losing its under branches, like the birch, retains them well.

In the closer parts of the woodland it forms poles of a very useful kind, and of equable thickness, well adapted for making light rails for laying across weak places in hedges, or similar purposes. I know of no tree comparable to it as a nurse for oak in a cold climate, either alone or mingled with larch, to which in the Tyrol it is often a near neighbour.

And in the cold, north-eastern parts of Britain, where coppices are now confined to sheltered river-banks and ravines, it would be quite practicable to form excellent coppice in the open country, by means of Ash and Silver Alder in equal proportions. Its advantage over other trees as a nurse for oak, consists in these properties—it grows rapidly while young, yet is well clothed with lower branches, has a narrow conical head, and does not lose its balance from the wind. Next, it ceases to grow taller just in time to let the oaks gradually take the lead and rise above it. This occurs at a height of 25 or 35 feet; and when it is cut out, the ground is not left unoccupied, for the offsets are there to form underwood immediately.

The average height of *alnus incana*, 20 years planted, in strong loam, 400 feet above the sea, in a stormy part of Northumberland, is from 25 to 35 feet, and they are remarkably stiff and robust against the wind. They will not now advance further in height.

Their favourite ground is land of any quality, whether strong or light, upon which the *aira cæspitosa*, or common bull-front, grows in strong hassocks:—a cool and moist climate. rather than peculiarity of soil, being most essential to them. They have been tried with perfect success on ground where Scotch firs and larches had been felled, and which, though dry, was full of bull-front hassocks, so that, as nurses, where resinous trees ought not again to be selected, they may come to be well worthy of attention in company with the birch and mountain sorb.

On superior soils, adapted to the oak, it will always grow vigorously as a nurse up to 30 feet, whatever be the grasses that clothe the surface; and, mingled with the birch, will be found to correct the too rapid upward growth of nurse-plants above the height of 30 feet, hitherto so injurious in all our oak plantations.

One caution I would add for the safety of young plants procured from the nurseries. These are often tall, weak, and drawn up (in close beds) to a height of four feet, with slender and naked stems, and you are told that they are the only plants to be got. When this is the case give them a year in your garden or nursery, in any cool, half-shaded corner, to acquire thickness, which they very quickly do. But if you decide to plant them out at once, then smear them well with a mixture of soot and cow-dung, to keep off hares and rabbits for the first and second seasons, or you may lose them all.

If the plants be only two or three feet high, and strong and bushy, they will be in no more danger than young birches. Nevertheless, as they are scarce in the nurseries, and not easily replaced if lost, it will be well to take precautions. The offshoots which will spring up naturally at a future time will be found to be safe enough from such destruction. It is always the newly inserted and weakly plant which is attacked by hares or rabbits, whatever be its species. Under the name of *alnus incana* (and Silber-erle in German) the seed might be easily procured from Hamburgh by any gentleman who wishes to raise plants in large numbers for himself.

As an ornamental addition to our sylva, the species is worthy of notice for its graceful, though not large, catkins, which adorn it in February; the fine play of its foliage in the summer breeze; and the warm, pinkish, puce-colour of its twigs, as the summer advances. It carries its leaves well into November, yet, like all the other alders, it lacks the golden tints that adorn the birch in autumn.

It will in all likelihood propagate itself by seed down the gravelly and sandy margins of our moorland streams, when planted near their feeders among the hills, and so become naturalized.

Our greatest arboricultural deficiency has always been that of a hardy secondary tree, which would be for our northern woods, what the hornbeam is for those of the southern counties of England. The silver alder will, in some measure, supply this want, if freely cultivated.

PROCEEDINGS OF THE CHEMICAL DEPARTMENT.

Report by Dr. ANDERSON on the Field Experiments made during the Season 1866.

THE best methods of conducting agricultural experiments, and securing from them the most reliable results, has formed a frequent subject of discussion in the Chemical Committee during the whole of its existence; and while recognising most fully the debt under which agriculture lies to those who have devoted much time and labour to such investigations, and the valuable results obtained through the Prizes offered by the Highland and Agricultural and other similar Societies, it was felt that many of these did not in all respects fulfil the wants of agriculture in its present condition. Many of the earlier experiments were necessarily defective, owing to the imperfect knowledge which then existed on the subject of the precautions necessary to secure success, and even of those more recently made it is not unfrequently apparent that the results obtained are by no means commensurate with the labour expended on them. Sometimes the omission of a trifling precaution, or the absence of some apparently minute piece of information, deprived experiments, otherwise admirable, and displaying the greatest care and perseverance, of half their value; and sometimes they were ill-devised, though carefully executed. Such errors were doubly unfortunate, because they were most apt to occur in the hands of young experimenters, who entered with enthusiasm on a course of experiment which they were induced to abandon by finding that the results did not come up to their expectations, and thus agriculture has often lost the assistance of men having in them all the elements of good experimenters, and only wanting a little experience to guide them.

But even more important than this is the want of systematic and comparable experiments, a want which was not experienced at first, but which the progress of agriculture has now brought into greater prominence. In general each experimenter has adopted his own course. His experiments have been perfectly isolated, and his results, though often extremely interesting and valuable to himself or his immediate neighbours, were much less important than they would have been had they admitted of comparison with those of others made in different districts. It may appear to some persons that if experiments are properly made they should always be comparable, provided only their results were properly classified and arranged, but practically it is impossible to do this in a satisfactory manner, as I can testify from practical experience. Some years since, I took the trouble to collect together a considerable number of experiments made during the same season, and proceeded to arrange and reduce them to similar terms so as to admit of comparison, but often expending on them a great deal of very irksome labour, I abandoned the task as hopeless.

The discussion of the methods of experiment which took place at different times in the Chemical Committee led to no definite course of action, until about two years since, I suggested the advisability of some of the most active experimenters throughout the country associating themselves together to form a sort of experimental club, for the purpose of making systematic experiments. On submitting this proposal to the Committee, it was suggested that it would be better to have such experiments made under the auspices of the Society, and a proposal to that effect was accordingly submitted to the Board of Directors, by whom a special committee was appointed to consider the subject and report. This Committee reported unanimously in favour of the proposition, and made many important suggestions as to the mode in which these experiments should be conducted. It was particularly recommended that they should be made according to a strictly identical plan in several different districts. That a general committee should be appointed to determine the kind of experiments, the districts in which they were to be made, and to exercise a general control over the whole, and that local committees should be formed in each of the districts to advise as to those circumstances which might arise within them. The Committee further recommended that the experiments should in the first instance be confined within as narrow limits as possible, and gradually extended as occasion offered, and that they should as far as possible be directed towards the elucidation of the principles of agriculture.

The Field Experiment Committee, which was appointed in the summer of 1865, entered on their duties with a full sense of their difficulty and importance. They felt that it was especially necessary to proceed by cautious steps so as to ascertain by degrees the best modes of working, and to accustom the experimenters to act well together, which they could scarcely be expected to do at first. It was resolved that the number of districts in which experiments were made should in the first instance be restricted to four, and after some discussion regarding the relative claims, the choice fell on East Lothian, Roxburgh, Forfar, and Ayr, which seemed to afford as wide a range of climate as possible. Circumstances having occurred by which the Committee had the means of having a set of experiments made in Wiltshire by a member of the Society well accustomed to experiment, the opportunity was taken of having a similar series of experiments made in a district so widely different in all respects from any part of Scotland.

The task of selecting the experimenters was undertaken by the Chairmen of the Local Committees, and in this matter we have been much indebted to the exertions of Mr. Hope, Fenton Barns; Mr. Roberton, Ladyrig; Mr. Drennan, Ayr; and Mr. Goodlet, Bolshan; through whose good offices the assistance of a number of able experimenters was secured. Some of the gentlemen who had originally undertaken to conduct the experiments were compelled afterwards to withdraw their names, but finally the following list was arranged:—

East Lothian—

Joseph Harper, Snawdon, Gifford.
George Hope, Fenton Barns, Drem.
John Richardson, Drylawhill, Prestonkirk.
S. D. Shirriff, Saltcoats, Drem.

Roxburgh—

J. Dove, Ecclesnewton, Kelso.
Robert Hardie, Harrietfield, Kelso.
J. Nisbet, Rumbleton, Greenlaw, Dunse.

Forfarshire—

Alexander Anderson, Boysack, Arbroath.
Alexander Bowie, Mains of Kelly.
Robert Mustard, Leuchlands, Brechin.
F. M. Nicoll, Littleton, Kirriemuir.
W. Smith, West Drums, Brechin.

Ayrshire—

J. Drennan, Holmston, Ayr.
Robert Cunningham, Shields, Monkton.
W. Young, Highfield, Ayr.

Wiltshire—

Russel Swanwick, Whittington, Chesterfield.

Experiments were commenced by all of these gentlemen, with the exception of Mr. Nicoll, who was prevented from making his in consequence of the non-delivery of the manures, which, owing to the neglect of the Railway Company, did not reach him in proper time;* but the unfortunate nature of the season rendered those, no less than four experimenters, useless.

Two matters of much importance received very careful consideration on the part of the Committee, and these were :—1st. The scale on which the experiments should be made ; and, 2d. The exact nature of those to be undertaken during the first season

On the first of these questions, the opinion of the Committee was almost unanimously in favour of working on the small scale ; and the considerations which led to this conclusion were mainly the great convenience, and economy of small experiments. It was seen, in fact, that comparatively few farmers can afford either the land or the time necessary for working on a large scale, such as half or a fourth of an acre, for example ; and there is no doubt that if the Committee had chosen such experiments, it would have been difficult to get a sufficiently large number of individuals to undertake them. The size of each plot eventually selected was $\frac{1}{112}$ of an acre, which, in the hands of Mr. R. J. Thomson, formerly of Grange, Kilmarnock, had been found to give excellent results, as can be testified by several members of the Society who have had occasion to inspect his results. It will be seen in the sequel that some precautions which he did not find necessary, are required in particular cases.

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* As an illustration of the minor troubles of such matters, it may be mentioned that the manures were dispatched to Mr. Nicoll at the same time as to the other experimenters, but when he sent to the Station, he was informed that no parcel had arrived for him. On inquiry a day or two after, he got the same answer, and as his post and railway address are not the same, he thought it possible I might have sent the manures to his post address. On inquiry at that station he found no parcels. He then wrote to me, and after much correspondence with the Railway Company, the manures were at last found at the proper station, where they had been lying during the whole time, although they averred that they had never reached it.

In fixing on the particular experiments to be made, the Committee had a difficult duty to perform. A number of valuable suggestions were made by different individuals of subjects well meriting investigation. After considering these, it was finally remitted to Mr. Goodlet, Bolshan, who has taken a lively interest in all the arrangements, and myself, to draw up a scheme of experiments, on the understanding that these should be of a simple character, and should embrace those matters which seemed most generally interesting. This, after having been submitted to the practical members of the Committee for their opinion, and having undergone some modifications, was finally approved of. The exact principles on which these experiments were based, will be more particularly explained, when the actual results are given.

The whole arrangements connected with the manures were undertaken by myself, and carried out in the laboratory. The substances used were all of the best quality that could be obtained. When delivered, they were carefully sampled, a quantity being taken from every bag, mixed with great care, and a portion of this being taken for analysis. A duplicate determination of all the more important constituents was made so as to avoid all risk of error, and from the results thus obtained, the quantity of the manure to be employed for each plot was calculated in the manner to be afterwards explained. The manure to be weighed was taken from each of the sacks, mixed so as to insure uniformity—just as had been done in sampling—weighed, and put into small canvass bags. Where two substances were to be applied to the same plot, they were weighed off separately, and then mixed in a large earthen basin by careful stirring and turning over. When glue was one of the substances employed, it was not mixed with the other, as it might have become damp, and the whole have set into a solid mass, but was sent out in a separate bag. A label of zinc, with distinctive numbers stamped upon it, was attached by a piece of wire to the mouth of each bag, and these were found to answer the purpose perfectly, and are infinitely preferable to paper or parchment, which are apt to become illegible from moisture, or the acids contained in the manures; and it was the confusion which arose from these causes, in a number of experiments made during the previous season, which led me to think of the metallic labels. The whole manures were then packed in casks, along with a quantity of Aberdeen

Yellow Turnip Seed, supplied by Messrs. Drummond and Sons, of Stirling, so that each experimenter was placed in precisely the same condition, both as regards manures and seed.

With each lot of manures, a letter of advice was dispatched, and a set of instructions, of which the following is a copy:—

INSTRUCTIONS *for laying out the Plots and sowing the Manures for the Field Experiments of Season* 1866.

1. Select a portion of the field in which the soil is as uniform as possible, avoiding headlands.

2. At 5 or 6 different places dig a small trench 10 inches deep, and from the side of it take a slice with the spade about 3 or 4 inches thick, as represented here. Mix the whole in a barrow, and take from this 5 or 6 lbs. as a sample of the soil. Go down other 10 inches and take a similar sample of the subsoil. Small bags and labels for these are sent along with the manures.

3. Let the drills in all cases be 27 inches wide.

4. Fix a stake in the corner of the space selected for the experments, and having counted the number of drills required for the plots, fix at the opposite end another stake, so that the line between the two may be at right angles to the drills. It will be found convenient to stretch a string between the stakes and to let a man walk along treading on the top of the drills, so as to make this line distinctly visible.

5. It will be most convenient to take 4 drills as the width of each plot, but should circumstances render it necessary, they may be made 6 drills wide.

6. If 4 drills be selected as the width, measure off along the drills from each stake a length of 43 feet 2 inches, and fixing stakes at these points, stretch the string between them and mark the line as before. Measure off another equal space along the drills, fix stakes and mark as before. There are thus obtained two parallel spaces, between which any 4 drills will be $\frac{1}{11}$ of an acre. Should it be resolved to make the plots 6 drills wide, the distance between the stakes must be 28 feet 9 inches.

7. The Experiments are in two different series, marked 1st Series and 2nd Series.

1ST SERIES—*Experiments with Soluble Phosphates, from types of the great sources, Minerals, Bone-ash, and Guano, with comparison between Gelatine and Sulphate of Ammonia.*

These Experiments are founded on the principle of applying the manures in such quantity as to supply 112 lbs. of Soluble

Phosphoric Acid, and 56 lbs. of Nitrogen, to the acre. They are in two divisions, in one of which the Nitrogen requisite is given in the form of Sulphate of Ammonia, and in the other in that of Gelatine, so as to ascertain whether there is any difference in the amount or rapidity of action of Nitrogen in these two forms. To be made in duplicate on Aberdeen yellow turnips, the plots being $\frac{1}{112}$ of an acre.

1. Dissolved Coprolites, and Sulphate of Ammonia.
2. Do. Bone-ash and Do.
3. Do. Baker's Island Guano and Do.
4. Do. Coprolites and Glue.
5. Do. Bone-ash and Do.
6. Do. Baker's Island Guano and Glue.
7. Do. Coprolites, alone.
8. Do. Bone-ash, Do.
9. Do. Baker's Island Guano, alone.
10. Sulphate of Ammonia, alone.
11. Glue, alone.
12. Nothing.

This series requires in all 26 plots, which should be arranged as in the subjoined plan.

1	2	3	4	Nothing.	5	6	7	8	9	10	11	Nothing.
Nothing.	6	7	8	9	10	11	1	Nothing.	2	3	4	5

2ND SERIES.—*Effect of Phosphatic and Ammoniacal Manures on Turnips, at different stages of growth.*

These experiments to be made on Aberdeen yellow turnips. Half plots to be lifted and weighed at intervals, which must to some extent depend on the season, and which will be afterwards more particularly intimated. The object being to ascertain the comparative effects of these manures at different stages of growth.

1. Sulphate of Ammonia, = 112 lbs. Nitrogen.
2. Superphosphate, = 112 lbs. Soluble Phosphoric Acid.
3. Do. = 84 lbs.; and Sulphate of Ammonia, = 28 lbs. of Ntrgn.
4. Do. = 56 lbs.; Do. = 56 lbs. Do.
5. Do. = 28 lbs.; Do. = 84 lbs. Do.
6. Nothing.

The plots should be arranged in this manner.

1	2	Nothing.*	3	1	2	Nothing.
Nothing.*	4	5	Nothing.	3	4	5

If these experiments be made in conjunction with the 1st Series, the nothing plots marked with an asterisk may be suppressed, as the end nothing plot of the 1st Series may then serve for both.

8. The manures are sent out in small sacks, each of which contains the quantity required for a single plot. To the mouth of each sack is attached a round metal label with two numbers upon it; the upper refers to the Series of Experiments, the lower to the number of the plot as given above; and as the plots are all in duplicate, there are in every case two sacks with the same number.

9. Arrange the bags in the order of the plots.

10. Have ready several large stoneware basins (milk basins will answer). Empty the manure out of one of the bags into a basin, add to it some sand or loam slightly damped, and mix the two carefully with the hand, turning them over several times so as to get them uniformly mixed. From the nature of the manures it will be found that there are great differences in the bulks, and for this reason the quantity of sand used must be so adjusted as to bring all to the same bulk in order to secure accuracy in sowing. No. 4 of the 1st Series and No. 2 of the 2nd Series will be found to be the largest in each case, and should these be sufficiently bulky they may be used without sand, and the others brought up to the same bulk by adding as much as may be necessary for this purpose.

11. Carefully preserve the whole of the bags and return them at your convenience to 15, Shuttle Street.

12. Two pounds of Aberdeen Yellow Turnip Seed are sent with each lot of manure, being a quantity sufficient to sow $\frac{2}{3}$ of an acre.

13. It is advisable that each experimenter should keep a small note book, in which to record the date of sowing, brairding, thinning, &c., and any other facts worthy of notice. Among these the days on which rain falls, and an approximate estimate of the number of hours it continues, are important.

14. Instructions for weighing the crop, with schedules for recording the results, shall be sent to each experimenter at a later period.

When the season for weighing approached, the following additional instruction for weighing was issued:—

1. Weigh bulbs and leaves separately, recording the weights of both.
2. A potatoe weighing machine is that best fitted for the experiment, and it will be found most convenient to take it into the field, and place it close to the plots.
3. Provide three boxes or large baskets, which can be placed on the weighing machine in which to weigh the crop. It will be advisable to make these all the same weight, by fixing pieces of lead to the lighter ones.
4. Two men or women put the produce of each plot into the boxes or baskets, and carry it to the machine, beside which the experimenter sits, adjusts the weights, and notes them in his book.
5. Deduct the weights of the boxes or baskets, and should these not be the same, care must be taken to number them, and note the number of each weighing, so that the proper weight may be deducted in each case.

At a subsequent period each experimenter was furnished with a set of tables, in which the results could be recorded in a uniform manner.

We shall consider separately the results of the two different series of experiments which were undertaken.

1ST SERIES.—*Experiments with Soluble Phosphates, from types of the great sources, Minerals, Bone-ash, and Guano, with comparison between Gelatine and Sulphate of Ammonia.*

The experiments of this series were undertaken for the purpose of determining, 1, Whether there is any difference in the manurial effect of soluble phosphates, that is, of phosphoric acid in a condition in which it easily dissolves in water according as it is derived from different forms of insoluble phosphate of lime; and, 2, To ascertain whether there is any difference in the effect produced by ready formed ammonia (in the state of sulphate), and a substance such as gelatine, which does not contain that compound, but only yields it gradually in consequence of the decomposition which it undergoes within the soil.

In regard to the first of those questions, when looked at from a purely chemical point of view, I have already frequently given it as my opinion that no difference ought to exist. So long as the phosphates are *insoluble*, it is consistent with all our knowledge that there should be a marked difference in accessibility to the plant of those contained in Guano, Bones, and Coprolites, or other mineral phosphates. In the first of these forms the phosphate of lime is in a state of subdivision far exceeding anything which can be obtained by mechanical processes; in bones they are less highly divided; while in coprolites or other mineral forms they are in so compact a condition as to present great resistance to solution, either by the active constituents of the soil, or by the roots, by whichever of these agents it may be, that they are brought into an assimilable condition. The difference between phosphates in these three states is sufficiently seen if small quantities of a guano previously burned to destroy organic matter, of bone-ash and of ground coprolites, be treated with the same acid. The first is found to dissolve in a very short time, the second requires considerably longer, and the phosphates of the third may be but imperfectly dissolved even after some hours. But it is quite otherwise when the phosphates have been dissolved. Chemistry then recognises no difference between them, and the source from which they have been derived can only be determined by ascertaining the nature of the impurities which may have been associated with them. With these facts before him, the chemist is led to conclude that *soluble* phosphates, from all the different sources, ought to have the same manurial effect, and to advise the farmer, when he wishes to make use of them, to take those which he can obtain at the cheapest rate. He, on the other hand, is naturally desirous that these opinions should be confirmed by actual experiment in the field, and to do this was one of the objects of the enquiry now to be recorded.

A similar question may be raised in regard to the different forms in which nitrogen is used as a manure. We know well that, in order to enable that element to maintain the growth of plants, it must be used in the form of some compound, among which ammonia is recognised as one of the most important, as it is also the simplest. But in bones, rape dust, and other similar substances that element is found in much more complex compounds, which must be decomposed and converted into ammonia before it becomes available to the crop. It is well known that these compounds do decompose in the soil, but the question remains whether the necessity for undergoing this transformation, before they become useful, may not in some cases so retard their action as to render them less valuable to the farmer than the ready formed ammonia. To this the chemist working in the laboratory can give no answer, because he has not the means of ascertaining how rapidly the conversion of these substances into ammonia takes place. That this change does occur is well known, and he may hazard the opinion that its rapidity may, in some cases at least, depend to no small extent on the nature of the soil, but it is only by field experiment that any satisfactory conclusions can be arrived at.

In order to submit these points to experiment, there were used three different kinds of superphosphate, made respectively from guano, bone-ash, and coprolites, without any admixture.

For the first, a manure made from Baker's Island Guano was selected, because that substance is the type of a guano phosphate, and contains so small a quantity of ammonia that it may be practically neglected. The sample used contained—

Water,	25·05
Organic Matter,	12·10
Biphosphate of Lime, equal to 38·65 soluble phosphates,	24·77
Insoluble Phosphates,	..
Sulphate of Lime,	37·90
Alkaline Salts,	trace.
Sand,	0·18
	100·00
Ammonia,	0·13

This manure, though rather too moist, was very uniform, and, from the fact that all the phosphates had been rendered soluble, was particularly well fitted for the experiments.

The dissolved coprolites contained—

Water,	22·60
Organic Matter, &c.,	9·77
Biphosphate of lime, equal to 23·07 soluble phosphates	14·80
Insoluble phosphates,	5·08
Sulphate of lime,	42·82
Alkaline salts,	0·28
Sand,	4·65
	100·00
Ammonia,	None.

Here, as usually happens with coprolites, a certain quantity of the phosphates remained undissolved, and this may be considered as unavoidable, in consequence of the compactness and difficult solubility of the original substance.

The Dissolved Bone-ash contained—

Water,	19·15
Organic matter, &c.,	7·42
Biphosphate of lime, equal to 30·30 soluble phosphates,	19·42
Insoluble phosphates,	11·70
Sulphate of lime,	38·06
Alkaline salts,	0·30
Sand,	3·95
	100·00
Ammonia,	None.

In this case, the quantity of insoluble phosphates was much higher than I had anticipated. My instructions to the manufacturer of the manure were, to send me a superphosphate in which all the phosphates were soluble; and though I did not expect that this could be done, it was hoped that not more than 2 to 4 per cent. would have been found insoluble. Had time permitted, an endeavour would have been made to procure another sample, but, unfortunately, this was not possible, and it was necessary to use the manure as it reached me.

The sulphate of ammonia was a good sample, containing 20·72 per cent. of nitrogen, equal to 25·16 per cent. of ammonia, or 97·58 of the pure sulphate. The glue used was good carpenters' glue. Reducing this substance to a state of powder proved a task of some difficulty. Previous experience had shown me that the only chance of succeeding was to kiln-dry it carefully, and then grind it under edge-stones, which Messrs. Poynter & Son, of Glasgow, undertook to do. After kiln-drying for some days, the attempt was made to grind it, but without success, and it was necessary to return it into the kiln and continue the drying process, until at length, by grinding and sifting, it was got in the form of a powder of about the fineness of coarse sand. In this state it contained 14·21 per cent. of nitrogen.

It was intended that the manures should have been dispatched to the experimenters in time for sowing in the last week of May, or first week of June, but owing to the unexpected delay occasioned by the difficulty of grinding the glue, they could not be sent out till the end of the first week of June, which is later than could have been desired in an ordinary season, but, as the event proved, was no disadvantage during the past year.

In the arrangement of the manures, it will be understood that each kind of superphosphate was used alone, at such a rate as to supply 112 lbs. soluble phosphoric acid;* again, mixed with sulphate of ammonia in quantity sufficient to supply 56 lbs. nitrogen; and a third time with glue, supplying the same amount of that element. Every plot was in duplicate, and the general arrangement was that shown in the instructions issued to the experimenters (see page 390), but they were not absolutely tied to this, as it was manifest that the nature of the piece of land selected for the experiments must to a considerable extent govern the arrangement.

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* The substance here called phosphoric acid is that known in the accurate nomenclature of modern chemistry as phosphoric anhydride, and I mention this particularly here so as to avoid misapprehension. I have preferred to use the term phosphoric acid, because, though less accurate, it is better known to non-chemical readers.

Experiments made by Mr. HOPE, *Fenton Barns, on Dirleton Farm.*

These experiments were made on a field near the sea, very slightly above its level, and with a light sandy soil, which no doubt had originally been almost pure sea sand. The field had been in pasture for four years, and a crop of oats had been taken from it in 1865. Previous to the last rotation it was taken out of old grass in which it had lain for forty years, and during this rotation it had been clayed at the rate of 200 carts per acre. A piece of land of uniform quality, but superior to the average of the field, was selected for the experiments. The experimental plots were sown on the 14th June, and were arranged as in the subjoined plan:—

WEST.

	0	1	7	1	0	8
	6	2	6	11	2	9
SOUTH.	7	3	5	10	3	10
	8	4	0	9	4	11
					5	0

At the time of sowing, the ground was not devoid of moisture, but it was clear that more rain would be necessary to ensure a good braird. The next day (15th), and also on the 17th, there were heavy showers, and on the 21st all the lots were above ground. After this there were some days of extremely hot weather—the thermometer standing at from 80° to 83° in the shade. On the 30th there was rain, and between the 1st and 4th of July, 0·35 inches fell. On the 7th all the plants were in rough leaf, and on the 20th they were singled. On the 23rd July the crop was examined, when No. 1 appeared little better than nothing; No. 2 had grown fairly—the plants being strong and dark; Nos. 3, 4, and 5 about equal, and rather better than No. 2; No. 6 very light in colour, but the plants equal; Nos. 7 and 8 had a few large plants among those of ordinary size; No. 9 about the best; Nos. 10 and 11 scarcely better than nothing. Rainfall during July, 3·3 inches

In the beginning of August, Nos. 2, 3, 4, and 5 were vigorous and dark in colour; No. 6 good; Nos. 7 and 8 quite inferior; No. 9 good; Nos. 10 and 11 not quite equal to the nothing plots. Rain fell in August 3·4 inches; in September ·28 inches. In October, the general appearance of the plots was very much as it was in August. Rain fell in October 1·1 inches. The crop was lifted and weighed on the 10th November, and the results are contained in Tables I. and II.*

Experiments made by Mr. SAMUEL D. SHIRRIFF, *Saltcoats, Drem.*

These experiments were made on a soil which may be described as a clay loam of uniform character. The previous crop was oats, top dressed with nitrate of soda, at the rate of 2 cwt. per acre. In the year before that the crop was hay, the aftermath being eaten off with sheep; and previous to that the crops, going backwards, were barley, potatoes, and wheat. No farm yard manure had been applied to the soil since 1854, all the crops having been raised by artificial manures, and up to the present time there have been no indications of diminishing fertility. The land was ploughed with a ten-inch furrow during winter, and prepared for sowing with the two-horse grubber and harrows, having been grubbed twice, rolled, and harrowed.

The experimental plots were sown on the 13th June, but, owing to the dryness of the weather, they entirely gave way, so that it was necessary to resow them on the 4th July, rather too late to secure a full crop. After this there was abundance of moisture, and the turnips came away rapidly. They were singled on the 5th August by hand, and to a uniform distance of 9 inches, which is less than usual, but was chosen in consequence of the lateness of the season.

The effect of the manure soon began to show itself very distinctly. The plots which had sulphate of ammonia and glue were far behind; bone-ash and sulphate of ammonia being the best, the others being pretty equal. All the plots where phosphates were applied alone improved greatly during the latter end of October. As the season advanced it became obvious that the plots robbed one another, the outer drills of those near particular manures being better than others. This is rendered very apparent by a plan (Table III.) transmitted by Mr Shirriff, showing the position of the plots as they grew, with the weight of each outer drill separately, and that of the two inner ones together.

From the inspection of this table it is quite clear that in certain cases the adjoining plots had robbed one another, but there are curious anomalies which it is impossible satisfactorily to explain. In the plot 0^2 for example, the outer drills have manifestly been affected by the plots on either side, for the weight of each single drill exceeds that of the two centre ones together; but in 0^3 the south drill is less than half the weight of the two centre drills, although containing a larger number of plants, while the north drill is not greatly increased. The difference here may be fairly attributed to the solubility of the sulphate of ammonia, which causes it to mix easily with the soil, and so affect the adjacent plants, while glue, being practically insoluble in cold water, lies where it is placed, and only yielding its ammonia by decomposition, that substance is absorbed by the roots near which it is generated before it has time to permeate the soil and reach the adjoining plants. It is remarkable that in the great majority of instances the sum of the weights of the two outer drills materially exceeds that of the two inner ones. This is better seen in Tables IV. and V., which give the details of the experiments arranged in the same manner as those of the other experimenters.

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* For Tables, see end of Article.

Experiments made by Mr. John Richardson, *Drylawhill, Prestonkirk.*

The soil in this case was a fine turnip soil, with an open subsoil, situated about eighty feet above the level of the sea. The previous cropping was Swedes, wheat, hay, tares, and then the experimental turnip crop. The rainfall during the summer and autumn months, as observed at East Linton, about one mile from the experimental field, by Mr. Storie, was:—

Month.	Total Depth.	Days on which ·01 or more fell.
	Inches.	
June........	0·84	11
July	3·96	11
Aug	2·16	20
Sept.	2·04	17
Oct.........	1·08	12
Nov.	1·98	9
Dec.........	1·22	14

The plots were sown on 13th June, arranged exactly as in the plan contained in the Instructions (page 390), and under favourable circumstances. The weather on the following day was dry, but slight showers fell on the 15th, 16th, and 17th. On the 20th, the braird began to show on that part of the field which was sown in the forenoon, and on the following day the remainder could be detected. On the 24th, the dry weather was seen to be operating disadvantageously, and owing to the attacks of the fly, Mr. Richardson feared the crop might never come to be singled. They improved, however, and on the 13th July, one-half the lots were thinned by hand, and hand-hoed between the drills. On the 19th, the remainder were thinned, and the whole again hoed between the drills. From this time up to the 29th, the weather continued dry and unfavourable to the growth of the turnip, but after that it entirely changed, becoming much too wet, with want of warmth and sunshine.

The whole of the plots appeared remarkably uniform, and on the 3d November, when they were examined by myself, it was difficult to detect any difference in the appearance of the plots. On those which had got no manure, the leaves were less luxuriant than on the others, but the bulbs were good. There was no appearance of the plots robbing one another; and the reason for this was abundantly obvious when the crop was weighed, when the differences in weight were found to be very trifling. As there was no apparent difference in the outer and inner drills, Mr. Richardson did not think it necessary to weigh them separately. The crop was weighed on the 10th December, and the results are contained in Tables VI. and VII.

Experiments made by Mr. Harper, *Snawdon, Gifford.*

The experimental plots were laid out in a part of a field of better quality than the great proportion of the farm, but situated at a height of 800 feet above the level of the sea. The soil may be described as good turnip land, though deficient in depth. The previous crops were oats, after three years' grass. Mr. Harper has found, as the result of numerous trials, that the manure best suited to his soil is a mixture of equal quantities of Peruvian Guano, Bolivian Guano, and Dissolved Bones; and that 6 cwt. per acre of this mixture is sufficient to raise a good green crop. When dung is used, he generally employs 4 cwt. With green top yellow turnips, Mr. Harper's practice is to use dung either in the drill or ploughed in in the autumn, and on land of inferior quality to that in which Swedes are grown. The turnips were sown on the 16th June, under favourable circumstances, a mild gentle shower coming on during the process. Mr. Harper, however, considers that the time of sowing was too late to secure a good crop, as he always aims at getting his yellow turnips sown as soon after Swedes, and as early in June, as possible.

The turnips brairded on the 26th; the nothing plots coming away just as well as those which were manured. There was rain on the 30th, and occasional showers up to the 4th July; and on the 5th there was heavy rain for some hours. The turnips were thinned on the 18th. From this time, and especially after the commencement of August, the weather was extremely variable, and the rainfall decidedly above the average. The crop was weighed on the 26th and 27th November, the weather being dry and favourable; but previous to this there had been several days of frost unusually severe for the season, by which the leaves were a good deal damaged. The roots of one of the No. 11 plots were somewhat affected by finger-and-toe, but all the others were healthy. The results are contained in Tables VIII. and IX.

Experiments made in the Roxburghshire District.

The Experiments made in the Roxburghshire district have proved far less favourable than those in East Lothian—only those of Mr. Nisbet having been brought to a successful termination.

Mr. Hardie, Harrietfield, sowed his lots on the 21st June, and the crop brairded satisfactorily. On the 28th and 31st July, they were singled by hand, and hoed on the 24th August, and appeared to be going on favourably. In the middle of October, however, they were found to be so much injured, apparently by the stoppage of a drain, that Mr. Hardie came to the conclusion that it was entirely useless to weigh them, as the results could only be fallacious.

A similar fate befell those made by Mr. Dove, Ecclesnewton. The field in which the experiments were made was sown with the ordinary crop on the 12th June, but the experimental turnips were not put in till the 14th. This trifling difference of two days made the most extraordinary difference in the progress of the turnips. The field brairded well and equally, and turned out a fair and uniform crop of from 18 to 20 tons per acre; but the experimental turnips, though sown only two days after the rest, did not braird at all till three weeks later, and then so unequally that they had to be thinned at three different times, and proved a very poor and irregular crop. Mr. Dove allowed them to grow as long as possible, hoping that some conclusions might be drawn from them; but upon weighing them, he found the results so anomalous, as to be entirely useless.

Experiments made by Mr. Nisbet, *at Rumbleton, Greenlaw, Dunse.*

These experiments were made on a light turnip soil, situated 550 feet above the sea. The field has been cultivated since 1833, on the five course system—namely, oats, turnips, barley, and two years grass. The land had been manured on each of the two previous rotations, with 10 to 12 tons dung, and 3 to 4 cwt. dissolved bones applied to the fallow tracts. The experimental plots were sown on the 14th June, the day being favourable for the purpose. Rain fell on the 15th and 16th. On the 21st the crops brairded, after which there was continuous dry weather till the beginning of July; after that there was much broken weather, and the rain-fall during the autumn months was much in excess of the average. The turnips were weighed on the 30th November. The weights are contained in Tables X. and XI.

Experiments made by Mr. ALEXANDER ANDERSON, *at Boysack, Arbroath.*

The piece of ground selected for these experiments was part of a field which had been cropped on the six course rotation, viz., 1861, barley, with grass seeds; 1862, grass, cut for hay, and afterwards pastured; 1863, oats, sown with 2 cwt. Peruvian guano per acre; 1864, potatoes, manured with 15 loads farm-yard manure per acre; 1865, wheat, to which 3 cwt. of artificial manure (1½ cwt. Peruvian guano and 1½ cwt. dissolved bones) was applied; and 1866, the present experiments. The soil is a black loam, of average depth and quality, and in rather poor manurial condition. The subsoil is gravel, with yellow clay and sand—altitude, 120 feet above the sea. The barley, grass, and oat crops, were all much under the average, but the potatoes and wheat were above it, both in bulk and quality.

The turnips were sown on 12th June, in plots six drills wide, and arranged as in the plan contained in the instructions sent with the manures. The weather at the time was rather dry, and there was just moisture enough to secure a braird. The plants were faintly visible along the drills on the 16th, and showed distinctly on the 18th. Nos. 8 and 9 came up first, and at the end of the third week of June looked vigorous and healthy, and were first into the rough leaf. They were closely followed by Nos. 6 and 7, which were indeed but little behind them. Nos. 1, 2, 3, 4, and 5, were a good way behind; and Nos. 10 and 11 only a little better than nothing plots. Rainfall in June, 1·03 inches.

Nos. 8 and 9 were ready for hoeing on the 6th July; Nos. 6 and 7 on the 8th; Nos. 1, 2, 3, 4, and 5, on the 9th; and Nos. 10 and 11, and the nothing plots, were not hoed until the 14th. Until the 18th of the month the weather was extremely warm, the thermometer on the 13th and 14th indicating 86° in the shade, and 110° in the sun; and at this time the relative position of the plots was unchanged, but some of the plants on No. 11 had withered under the excessive heat, and others being attacked by worms and insects, had begun to decay. One of the No. 2 plots was also very bad in this respect, although its duplicate was quite healthy and vigorous.

On the 30th July the relative positions of the plots had somewhat altered. No. 8 was still the best; then came No. 1, which was remarkably vigorous and healthy. These were followed by Nos. 9, 4, 3, and 7, in the order here mentioned, and nearly equal. Nos. 2 and 5 were behind them, but the latter was now beginning to grow rapidly. Nos. 10 and 11 were still unpromising, though beginning to improve a little. The nothing plots healthy, but very deficient in luxuriance.

Rainfall in July, 2·18 inches.

During the greater part of August the weather was well suited to the turnip, the atmosphere being moist, with frequent showers. On the 25th, Nos. 4 and 5 appeared the best, the latter having greatly improved; Nos. 1 and 3 fair; No. 2 not so good; Nos. 6 and 7 had lost their deep green tint, but were rooting well; No. 8 light in colour, and leaves withering and falling off, but its roots larger than those of any of the other plots. No. 9 had fallen off in appearance, and did not look healthy; Nos. 10 and 11 far behind, but more healthy in appearance. On the nothing plots the plants were remarkably healthy, but small, and quite free from disease; while on all the manured plots stray bulbs were found slightly affected by finger-and-toe, and the fly attacked the leaves of some of them, especially Nos. 10 and 11. This Mr. Anderson attributes to the period of sowing, and dry weather supervening before the plants were well rooted; as other yellow turnips on the farm, which had been sown a fortnight earlier, and which were well started before the drought in July, were quite free from disease.

Rainfall in August, 2·15 inches.

On the 12th September the plots were again examined, when No. 1 was found to be still very good; Nos. 2 and 3 not very good, and the leaves withered and somewhat unhealthy in appearance. Nos. 4 and 5 had improved greatly, and now looked better than any of the other plots; Nos. 7 and 9 had passed their best, and showed a large number of withered leaves; No. 8 the same, but better rooted; Nos. 10 and 11 still but little better than nothing.

Rainfall in September, 3·0 inches.

During the month of October the plots continued much as they were in September—Nos. 4 and 5 being the best, though No.. 1, was rather deficient in bulbs. The nothing plots were remarkably close and regular, though not well rooted. The weather continued rainy and damp. Finger-and-toe has not injured any of the plots, the wet weather having checked it, by inducing vigorous growth.

Rainfall in October, 2 02 inches.

In November there was little change, and about the 20th, the crop appeared to have arrived at maturity.

The rainfall was 1·86 inches.

The produce was weighed on the 8th and 10th December. It will be noticed that one of the No. 2 plots shows a much smaller produce than the other. This is due to the fact that, for some reason or other, it was extremely deficient in plants, their number not being above half of what it was in the other plots. The details will be found in Tables XII. and XIII.

Experiments made at Leuchland, Brechin, by Mr. Mustard.

The soil on which these experiments were made is a good sound loam, resting on clay, situated about 120 feet above the sea level. It was for many years worked under the five course rotation. At present it is under a seven shift course, consisting of three grain crops, two green, and two years grass. No manures have been applied within the last three or four years. In autumn it got a fair furrow with two horses, and early in May was twice grubbed and cleaned in the usual way.

The crop was sown on the 13th June, the weather being very dry, with strong sun and moderate breeze. The arrangement was the same as that in the plan, except that the first nothing plot was between Nos. 5 and 6, instead of between 4 and 5.

Rain fell on the 16th, 19th, and 20th, and the braird appeared on all the plots on the 21st. Favourable weather, with heat and occasional showers, followed, till the 21st July, when the crop was thinned. From the 15th to the 26th the weather was dry and warm, and the crop went on well, with the exception of Nothing, 10, and 11, which were very poor.

During the whole of August and September the weather was very wet.

The crop was weighed on the 5th December. The results are contained in Tables XIV. and XV.

Experiments made at West Drums, Brechin, by Mr. W. Smith.

The field on which these experiments were carried out is a light sandy soil, having a porous rocky subsoil, interspersed with beds of sandy clay, and resting on the old red sandstone. It is 300 feet above the level of the sea, and has a south-westerly exposure. The field had been for three years in grass, pastured, and two years oats, before the grain crop of 1866. The second crop of oats got 2 cwt. Peruvian guano, and 1 cwt. of salt per acre. The poorest portion of the field was selected for the experiments, in order to give as fair a result as possible. The soil is easily made for turnips, and the season was favourable to their growth on it, but on all heavy lands in the neighbourhood it was quite the reverse—the severe drought in the early part of the season having prevented their brairding.

The seed was sown on the 18th June, and the crop brairded very regularly, and was thinned on the 15th July. Plots 1, 2, and 5, took the lead, after thinning, and kept it during the whole season. The rainfall in July was above the average. In August it was unusually dry; during the rest of the season it was generally moist.

The crop was weighed on the 19th December. In this case I have given only the arranged table of results (Table XVI.), the only one which has been supplied me.

Experiments made by Mr. A. Bowie, *Mains of Kelly, Arbroath.*

The field on which these experiments were made had been previously submitted to two rotations on the six shift system—the grass in both cases having been cut for hay. In the first, a liberal supply of manure had been applied to the potatoes and the wheat, the following turnip crop having been raised with special manures (chiefly phosphates) alone. The barley following the green crop received about 22 tons of well-made manure per Scotch acre. In the second rotation the wheat got no farmyard manure, and only 4 cwt. of bone-dust. Rinderpest having greatly reduced the supply of manure in 1866, Mr. Bowie resolved again to raise his turnips with special manures; and this field, having been rather severely treated, and deficient in vegetable matter, he selected as peculiarly suited for the experiments. The wheat crop of 1865 was good, and the autumn stubble furrow deep and dry, so that two important preliminaries to a good turnip crop were secured. The field was cross ploughed, and in spring grubbed, and repeatedly harrowed and rolled.

The seed was sown on the 13th June, at a time when the weather was too dry, the rainfall during May and June having been extremely small—in the latter scarcely exceeding 1·0 inch. In spite of this, the crop came away very equally, and though the plots of the second section were thinner than those of the first, it was found that when they were singled on the 13th July, at ten inches apart, there was little difference between them, the number of plants not varying more than from 1 to 4. Unfortunately Mr. Bowie did not count the plants when weighed, but none of them died out, though some were imperfectly developed.

The crop was carefully examined before singling, on the 11th July, but the only plot then marked as noteworthy was No. 6, which was scarcely better than the nothing plots.

Another examination was made on the 11th August, when No. 6 appeared even worse than the nothing; and it was further noticed, that on all the plots of the second section disease had manifested itself—in some cases strongly, in the shape of round holes in the leaves, as if perforated with shot, and the bottoms of them coloured yellow, as if finger-and-toe were about to appear. Nos. 8, 9, and 10, of the second section were exceptions to this, and all good. No. 11 of the second section was much diseased and inferior, while the corresponding plot on the first was superior.

On examining the rest of the field, Mr. Bowie found local disease in all parts of it, but nothing compared with what it was on the part occupied by the second section of the experiments, where the disease may be said to have almost concentrated itself. The soil of the field being remarkably uniform, Mr. Bowie was at first at a loss to account for the phenomenon, but at last he remembered that the wheat crop of 1865 had been cut with a heavy three-horse Burgess & Key reaper, which at first, and to a certain breadth, cut round the field, but afterwards the crop being lodged in some places, it was cut on two sides only, the machine continuing to go round the other two sides without cutting, which produced a much trodden pathway along the latter. It was then remembered that a large proportion of the second section plots were on this pathway. Mr. Bowie has no doubt that this, and the mild winter which prevented the due pulverisation of the soil, is the cause of the remarkable difference thus observed; and he remarks that he has repeatedly traced a tendency to finger-and-toe in the trail of a reaper which has frequently gone over the same ground.

There can be no doubt that these facts sufficiently explain the peculiarities observed in all cases, except the No. 11 of the second section, which remains anomalous. The observation is also extremely interesting, as it shows what trifling circumstances may affect the results of agricultural experiments. Mr. Bowie remarks that the season has been most unfavourable to the turnip, from the persistent drought and prolonged frosts extending far into the summer—for there were hail and ice between the 15th and 21st June—which were just the conditions likely to produce disease; and it was only the moisture and warmth of the latter part of the year which brought the produce up to the point it actually reached.

Mr. Bowie not having numbered the bulbs, nor weighed the leaves of his experimental plots, has thought it better to give his results in a form different from that adopted for the other experiments; and I, therefore, give his tables just as he supplied them.

Table XVII.—Giving the Results of First Series of Experiments in Topped and Tailed Bulbs.

1866.	Kinds of Manures.	Weighed on 11th December.					
		Section 1.		Section 2.		Averages.	
Nos.		Tons	Cwts	Tons	Cwts	Tons	Cwts
1	Dissolved coprolites and sulphate of ammonia	18	12	11	13	15	2½
2	Do. bone-ash, do. do.	21	14	15	0	18	7
3	Do. Baker's Island guano, do.	19	4	11	18	15	11
4	Do. coprolites and glue, do.	20	16	11	18	16	7
5	Do. bone-ash, do.	22	12	15	11	19	1½
6	Do. Baker's Island guano, do.	13	12	14	16	14	4
7	Do. coprolites alone,................	17	6	15	6	16	6
8	Do. bone-ash, do.	18	16	19	2	18	19
9	Do. Baker's Island guano, alone....	20	12	18	4	19	8
10	Sulphate of ammonia, do......	21	2	17	0	19	1
11	Glue, do... ..	20	6	10	4	15	5
0	Nothing,............................	15	5	12	18	14	1½
0	Nothing,............................	14	5	12	2	13	3½

Table XVIII.—Averages of Weights of Bulbs per Imperial Acre, from Table of First Series of Experiments 1866.

	Weighed 11th Dec.			
	Tons.	Cwt.	Qrs.	Lbs.
Averages of the 3 coprolites, mixed and alone, in both sections,................	15	18	2	0
Do. 8 bone-ashes, do. do. do.,..................	18	15	3	9
Do. 8 Baker's Island guano, do. do,..................	16	7	2	18
Do. 8 coprolites, do. do. in Section I.	18	18	0	0
Do. 8 bone-ashes, do. do. do.,..................	21	0	2	18
Do. 8 Baker's Island guano, do. do.,..................	17	16	0	0
Do. 8 coprolites, do. do. in Section II.,..................	12	19	0	0
Do. 8 bone-ashes, do. do. do.,..................	16	11	0	0
Do. 8 Baker's Island guano, do. do.,..................	14	19	1	9
Average of all the manured plots, in both sections,..................	17	1	0	10
Do. 4 Nothing do. do.	13	12	2	0
Averages of the 5 "alone" plots, do.				
Average of Field in which these experiments were conducted, and exclusive of them..................	21	15	0	0

And which got the following applications:—

8 cwt. Peruvian guano, and 1 cwt. "Somerville's" manure, per Scotch acre.

8 cwt. bone-dust, and fully 8 cwt. hen and pigeon manure, night soil, and household ashes—the bone-dust, and what follows, noted above, having been mixed for several weeks previously to use, were repeatedly turned, fermented, and reduced, then mixed with the Peruvian, &c. before sowing—cost £3, 18s. per acre Scotch.

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Experiments made in Ayrshire.

The experiments made in Ayrshire have only been successful in the hands of Mr. Young, Highfield, those made by Mr. Drennan, Holmston, and Mr. Cunningham, Shields, having proved failures almost from the first. Owing to the unfavourable weather the crop in both cases was so much injured by the fly that it was obvious from an early period that no reliance could be placed on them, and it was considered mere waste of labour to attempt to weigh them.

Experiments made by Mr. Young, *Highfield, St. Quivox.*

The field on which these experiments were made is situated about two miles from the Frith of Clyde, at a height of about 70 feet above the sea level. The land is light, with a sandy subsoil. The crops since 1858 have been, two years pasture, oats, potatoes, barley, pasture, oats, turnips.

The plots were six drills wide, and were arranged in one long line down the field in the following order:—N (1), 1, 6, 2, 7, 3, 8; N (2), 4, 9, 5, 10, 6, 11; N (3), 7, 8, 2, 9, 3; N (4), 10, 4, 11, 5, N (5). The crop was sown on the 13th June, the land being in excellent order and sufficiently damp to braird the seed, which came away on the 19th. On the 21st the plants were attacked by the fly and much eaten. On the 18th July the crop was thinned eleven inches apart, and the plants were good except on the Nothing plots, both No. 10, and one No. 11. On the 3d August the crop was cleaned with the hoe, and some plots still looked ill.

The plants were weighed on the 29th November, and were found to be all sound, but the number of the different plots varied very much—so much so indeed that some of them admit of no satisfactory comparison. The unfavourable nature of the weather may be best judged of from the table of the rainfall obtained from a rain-guage on the field which Mr. Young has supplied—

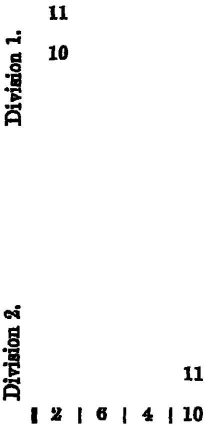
Month	Day.	Rainfall.			Month.	Day.	Rainfall.		
		For the Month	For the Week	Total from 13th June			For the Month.	For the Week	Total for 13th June
June	13				Oct.	1	5·0	1·9	13 3
	21		0·7	0·7		4		0·0	13 3
	28		0 0	0 0		11		0 0	13·4
July	5		0·7	1·4		18		0·1	14·4
	12		0·5	1·9		24		0·6	14·0
	19		0·1	2·0		31	2 3	1·6	15·6
	26		0·0	0·0	Nov.	1		0 0	15·6
	31	2 6	1·3	3·3		8		1·6	17 2
Aug.	2		0·5	3·8		15		1·3	18·5
	9		1·5	5·4		22		1·1	19·6
	16		0·5	5·9		29		0·9	20·5
	23		1·6	7·5		30	4·9	0·0	20·5
	30		0·8	8·3	Dec.	6		0·6	21·1
	31	5·0	0·0	0 0		13		1·7	22·8
Sept.	6		0·5	8 8		20		1 2	24·0
	13		0·9	9·7		24		0 2	24·2
	20		1·7	11·4		31	5·2	1·5	25·7

The details of the experiments are contained in Tables XIX. and XX.

Experiments made by Mr. Russell Swanwick *in the neighbourhood of Cirencester.*

The farm on which these experiments were made is situated in the northern part of the county of Wilts, and lies on the Oxford Clay, about 500 feet above the level of the sea. The farm has been in the possession of the present owner for a few years only, and when it came into his hands it was a perfect wilderness, scarcely producing a crop worth harvesting. It was then undrained, but since then has been partially drained and greatly improved, the pasture land, however, having received the largest share of attention, and having been brought by careful management to yield large crops of grass and hay. No part of the drained land was available for the experiments, but Mr. Swanwick considered that the results obtained from the heavy clays in a comparatively unimproved state would be interesting, although the absolute amount of produce might not be large.

The piece of ground chosen lay nearly flat, and was of even quality, and of the heaviest description of clay. It was undrained, but the clay was thrown up in ridges or "lands." These lands are about 8 feet wide, and raised 6 or 8 inches above the furrow when first ploughed. The previous cropping had been wheat with Italian ryegrass, the former receiving 1 cwt. nitrate of soda per acre. The Italian ryegrass was fed off with cattle, and ploughed up for oats, which were manured with 2½ cwt. superphosphate, 1½ cwt. guano, and 1½ cwt. salt. The oat stubble got a very light dressing of farmyard manure (about 3 tons per acre) early in spring, which was ploughed in, and the land intended for the experiments well worked. The surface could scarcely be made as fine as Mr. Swanwick thought desirable at the time, but experience showed that it would have been better had it been left in a rougher state.



The plots were marked out in two "lands," such a length being taken as made exactly $\frac{1}{113}$th of an acre, and the whole were arranged as in the diagram, the experiments being made in quadruplicate and not in duplicate, as those of the other experimenters were.* The manures were sown on the

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* Mr. Swanwick, as I understood, intended to have made two sets of experiments on different kinds of soil, but not finding suitable land, made a quadruplicate series.

26th and 27th June, and on the evening of the latter day there was an unusually heavy thunder shower, no less than 2 inches of rain having fallen in three hours, which prevented the seed being put in till the 30th, on which day it was sown broadcast on the flat and hoed in. It is not the custom in that district to ridge the turnips, and Mr. Swanwick thought that greater accuracy would be obtained by falling into the ways of the country than by attempting to get men to do what they were unaccustomed to. Within twenty-four hours' of sowing there was 0·5 inch of rain.

The turnips brairded within a week, and came up nearly at the same time on the different plots, though the plants were a little patchy. They were hoed on the 21st and 23d of July by a careful man, who hoed them as regularly as possible. They were again hoed on the 8th and 9th August. On the 16th August, plots 3, 6, and 9 were best, 1 and 4 next, then 2, and 10 and 11 were worst. The effect of the heavy rain which occurred before sowing was seen in a very marked degree during the progress of the crop. In fact, it was obvious that it had caused the clay to run together, and so prevented the expansion of the bulbs, and in this respect the repeated working which the experimental plots got was disadvantageous, for on the adjoining "land," which had not been nearly so much worked and was much rougher, the same turnips, though unmanured, were almost as good as the best of the experimental plots, and produced nearly three times as much as the nothing plots.

The month of September was most unfavourable, rain having fallen every day but one. There was a perpetual drizzle and little sunshine, so that the roots of many plants rotted in the ground, and thus deprived the bulbs of further nourishment. The unusual character of the rainfall will be obvious from the following table :—

	Inches.
May	0·8
1st June to 27th June	2·4
27th " to 30th "	2·0
1st July to 7th July	1 0
7th " to 14th "	0·0
14th " to 21st "	0·0
21st " to 31st "	0 5
1st Aug. to 7th Aug.	0·9
7th " to 14th "	0·6
14th " to 21st "	0 0
1st Sept to 30th Sept.	5·9
1st Oct. to 31st Oct.	2·0
1st Nov. to date of lifting	1·7

The crop was weighed on the 26th and 27th November, and the results are contained in Tables XX., XXI., XXII., and XXIII.

I shall not attempt to enter into any elaborate description of the experiments now recorded, which may indeed be allowed to speak for themselves, but a few observations may be made regarding some of the prominent lessons to be observed from them.

It is unnecessary to do more than refer to the care which has been taken by all the experimenters to secure the utmost practicable degree of accuracy, for this is obvious to every one who examines them, and is still more so to myself, from my having been in frequent correspondence with these gentlemen during their progress. Neither is it necessary to enlarge on the very unfavourable nature of the season, unfavourable to the turnip crop, and singularly so to agricultural experiments of all kinds. On this account the work of no less than four experimenters proved entirely abortive, and those of several others were at one time in jeopardy. The severe drought of the early, and the excessive rains of the later part of the season were most unusual, and, though the latter undoubtedly produced a much better crop than was at one time expected, it cannot be considered as having been otherwise than disadvantageous. For an ordinary season the time of sowing was too late to secure a *large* crop; but, on the other hand, the experimental plots on that account escaped risks which they might have incurred had they been put in during the dry weather of the first week of June, and it must be borne in mind that in such experiments it is not so much the absolute amount of the crop as that of the relative produce on the different plots, which is of importance.

One of the most noticeable points observed in the experiments was the tendency in some cases on the part of the plots to rob one another, and at its first observation I greatly feared that the whole results would be invalidated; but in the hopes that something might nevertheless be made of them, I requested that the outer and inner drills of each plot might be weighed separately, if it appeared necessary. In some cases the experimenters saw no appearance of any of the plots borrowing from one another, and did not think it advisable to make this separate weighing, and in others, where it was done, the result was to show that there had been no such effect. It appears, indeed, only to have occurred in the very light soils, in which the roots of the plants are able to travel some distance in search of food. The possibility of one plot drawing sustenance from an adjoining one is a matter to which I directed attention some time since; and in an address on "Experimental Agriculture," given at the Stirling Show, in 1864 (Transactions, Vol. XVI., page 362), I advocated the plan of surrounding each plot with a sort of frame, as it were, manured in a similar manner to itself, and weighing only the inner part. Having subsequently seen a large number of small experiments in Ayrshire, in none of which could the smallest indication of borrowing be detected, I was led to the conclusion that this precaution was unnecessary. It now appears, however, that it may sometimes be desirable to carry it out, at least on light soils.

Taking the whole of the experimental results together, they appear to bear out the opinion that there is no difference in the effects of soluble phosphates derived from the three different sources employed. There is a slight advantage in favour of bone-ash, which may be attributed to the quantity of insoluble phosphates contained in the manure used, although it is too small to be of any importance. The individual experiments, however, are not so conclusive in this respect, for in some instances the dissolved guano has produced a somewhat larger crop than the others, and there are cases in which the dissolved coprolites have the advantage. At first sight it appeared possible that this might depend on the nature of the soil, but a more minute examination showed that this explanation would not hold good, for in scarcely any case was it found that all the plots containing, for example, coprolites (whether alone or mixed) had the advantage, but that in general the superiority was brought out by that of one which, for some reason not easily traceable, exceeded the others. As very trifling circumstances may affect the results derived from a single plot, no stress can be laid on this.

One of the most remarkable features of the experiments is the entirely negative effect of nitrogenous manures when applied alone—the plots Nos. 10 and 11, which were dressed with these manures, giving no more than the nothing plots, and in some instances even less. Even when mixed with phosphates their effect in some cases is insignificant, but most generally the two together produce a better effect than either alone, and sometimes the difference in this respect is very striking. In those in which the previous treatment of the soil had been liberal the effect of nitrogen is least marked, no doubt because a supply had accumulated in it sufficient for the requirements of the crop; while in the poorer soils, and in those of a sandy character, on which these manures are more rapidly exhausted, their effect is very manifest.

The general result as regards the comparison between ready formed and what has been sometimes called potential ammonia, tends to show that there is no marked difference between them, the glue having on the whole produced as favourable an effect as the sulphate of ammonia. It would be wrong, however, to conclude that this result will always be obtained, because the season was peculiarly favourable to the decomposition of the glue; and it is quite conceivable that there may be times when a marked difference might occur.

The great variety in the produce of the nothing plots is also especially worthy of notice, and shows how important it is that they should never be omitted in making field experiments. They are the test of the natural capabilities of the soils, or of the condition into which they have been brought by cultivation. On the lighter and poorer soils it is obvious that the turnip is almost entirely dependent on manures, while on good soils, in good condition, the effect even of the large applications used in these experiments is comparatively unimportant.

The relations between the produce and the chemical composition of the soils, is a subject on which I do not propose to enter at the present time. I am now engaged in a very elaborate series of analyses of the soils on which the turnips grew, which has proved so tedious, that I have been unable to complete it in time for this report; and in place of giving a part of the results now, I prefer reserving them until complete, when they will form a contribution to our knowledge of the composition of turnip soils in general.

The length to which this report has extended prevents my entering on the consideration of the experiments of the second series, which must be reserved for a future report. It may be stated, however, that their results have, as a whole, been less satisfactory than those of the first series. The produce was much less regular, and the crop less healthy throughout, and it would probably be advisable to repeat them with some modifications. Still the results are interesting, and shall be discussed on a future occasion.

Table I — Giving the Results of the 1st Series of Experiments at Dirleton Farm

	N (1)			1			2			3			4			N (2)			5		
	No of Bulbs	Weight of Bulbs	Weight of Leaves	No of Bulbs	Weight of Bulbs	Weight of Leaves	No of Bulbs	Weight of Bulbs	Weight of Leaves	No of Bulbs	Weight of Bulbs	Weight of Leaves	No of Bulbs	Weight of Bulbs	Weight of Leaves	No of Bulbs	Weight of Bulbs	Weight of Leaves	No of Bulbs	Weight of Bulbs	Weight of Leaves
Outer Drills,	92	70	30	89	199	71	83	176	60	96	210	68	84	233	97	73	64	23	89	204	68
Inner Drills,	92	60	27	90	186	67	94	199	68	98	238	70	84	217	67	82	66	21	91	205	61
Total,	184	130	57	179	385	138	177	375	128	194	454	144	166	450	164	155	130	44	180	409	129
	6			7			8			9			10			11			N (3)		
Outer Drills,	94	212	74	90	157	48	86	178	53	90	186	56	80	116	51	85	91	44	86	173	57
Inner Drills,	92	186	65	92	182	50	93	154	46	92	187	46	96	93	40	90	98	41	96	78	27
Total ..	186	398	139	182	339	98	179	332	99	182	373	102	176	209	91	175	189	85	182	251	84
	N (4)			1			2			3			4			5			6		
Outer Drills,	90	75	26	93	205	69	83	170	60	87	234	86	87	211	66	87	188	71	96	215	79
Inner Drills,	86	78	27	91	200	72	94	199	68	86	219	72	88	162	60	91	205	70	87	197	64
Total,	179	153	53	184	405	141	177	375	128	173	458	58	175	393	126	178	393	141	183	412	143
	7			8			9			10			11								
Outer Drills,	97	202	58	99	235	68	96	218	58	98	88	47	91	58	37						
Inner Drills,	99	153	42	93	185	52	87	216	63	81	88	36	72	55	32						
Total,	196	355	100	192	420	120	183	434	121	179	176	83	163	113	69						

Table II.—Arranged Plan of the 1st Series of Experiments made at Dirleton Farm—giving the Produce in lbs. per plot or cwts. per Acre, with the Average of the Two Sections in tons and cwts.

	N				1				2				3				4				5			
	Bulbs.	Leaves.	Gross.	Leaves p. cent.	Bulbs.	Leaves.	Gross.	Leaves p. cent.	Bulbs.	Leaves.	Gross.	Leaves p. cent.	Bulbs.	Leaves.	Gross.	Leaves p. cent.	Bulbs.	Leaves.	Gross.	Leaves p. cent.	Bulbs.	Leaves.	Gross.	Leaves p. cent.
Section I. .	180	57	187	48.0	385	138	523	35·8	375	128	503	31·4	454	144	598	31·7	450	164	614	36·4	204	68	272	33·3
Section II. .	153	53	206	34·6	405	141	546	34·8	375	128	503	31·4	453	58	511	12·8	398	126	519	32·0	205	61	266	29·7
Total . . .	283	110	393		790	279	1069		750	256	1006		907	202	1109		848	290	1133		409	129	538	
Average . .	141·1	55	196·1	38·8	395	139.5	534	35·3	375	128	503	31·4	453	101	554	22·2	421	145	56·6	34·2	204	64	266	31·5
	Bulbs.		Leaves.		Bulbs.		Leaves.		Bulbs.		Leaves.		Bulbs.		Leaves.		Bulbs.		Leaves.		Bulbs.		Leaves.	
	Tons.	Cwts.	Tons.	Cwts.	Tons.	Cwts.	Tons.	Cwts.	Tons.	Cwts.	Tons.	Cwts.	Tons.	Cwts.	Tons.	Cwts.	Tons.	Cwts.	Tons.	Cwts.	Tons.	Cwts.	Tons.	Cwts.
Average per Acre in Tons & Cwts.	8	6	2	1·45	19	15	6	19·5	19	6.5	6	12·5	22	13·5	7	11	21	1·5	7	5	20	1	6	15

	6				7				8				9				10				11			
	Bulbs	Leaves.	Gross.	Leaves p. cent.	Bulbs.	Leaves.	Gross.	Leaves p. cent.	Bulbs.	Leaves.	Gross.	Leaves p. cent	Bulbs.	Leaves.	Gross.	Leaves p. cent.	Bulbs.	Leaves.	Gross.	Leaves p. cent.	Bulbs.	Leaves.	Gross.	Leaves p. cent.
Section I. .	398	189	587	34·9	338	98	436	28·9	332	99	431	2·99	378	102	475	30·0	209	91	300	43·5	189	85	274	45·5
Section II. .	412	143	555	34·7	355	100	455	28·1	420	120	540	28·5	1134	121	1255	10·0	176	83	259	47·1	113	69	182	61·0
Total . . .	810	282	1092		693	198	891		752	219	971		1507	223	1730		385	174	559		302	154	456	
Average . .	405	141	546	34·8	346	99	445	28·5	376	109	485	29·2	758	111	865	20·3	192	87	279	45·3	151	77	228	53·2
	Bulbs.		Leaves.		Bulbs.		Leaves.		Bulbs.		Leaves.		Bulbs.		Leaves.		Bulbs.		Leaves.		Bulbs.		Leaves.	
	Tons.	Cwts.	Tons.	Cwts.	Tons.	Cwts.	Tons.	Cwts.	Tons.	Cwts.	Tons.	Cwts.	Tons.	Cwts.	Tons.	Cwts.	Tons.	Cwts.	Tons.	Cwts.	Tons.	Cwts.	Tons.	Cwts.
Average per Acre in Tons & Cwts.	20	5	7	1	17	7	5	4	18	19	5	9·5	20	3·5	5	8·5	9	12·5	4	9	7	11	3	17

Table III.—1st Series of Experiments on the Farm of Saltcoats, East Lothian, 1866.

NORTH.

Total.	No. of Bulbs.	Total.	Weight of Stems	Total.	Weight of Roots.					Weight of Roots.	Total.	Weight of Stems	Total.	Number of Bulbs	Total.
		lbs.	lbs.	lbs.	lbs.					lbs.	lbs.	lbs.	lbs.		
175	47 91 37	59	11 36 12	88	22 49 17	Nothing.	12	Disd. Bone Ash, and Glue	5	67 109 65	241	33 68 34	135	55 98 46	199
168	39 86 43	45	12 22 11	68	16 34 18	Glue alone.	11	Disd. Coprolites and Glue.	4	65 112 68	245	30 60 33	123	48 98 49	195
190	46 93 51	72	16 38 18	108	24 52 32	Sulphate of Ammonia alone.	10	Disd. Baker's Island Guano and Sulphate of Ammonia.	3	63 114 72	249	31 62 32	125	49 97 54	200
198	53 93 52	69	23 29 17	214	64 94 56	Disd. Baker's Island Guano alone.	9	Disd. Bone Ash, & Sulphate of Ammonia.	2	69 119 77	265	30 58 34	122	56 94 49	199
193	47 98 48	72	21 37 14	230	63 115 52	Dissolved Bone Ash alone.	8	Nothing.	12	40 29 32	101	23 16 17	56	44 83 45	172
203	52 99 52	62	13 26 23	190	46 90 54	Dissolved Coprolites alone.	7	Disd. Coprolites & Sulphate of Ammonia.	1	59 109 82	250	27 52 57	136	57 95 53	205
190	53 97 40	113	31 52 30	267	71 120 76	Disd. Baker's Island Guano and Glue.	6	Glue alone.	11	26 40 15	81	19 28 9	56	45 98 49	192
192	49 96 47	121	25 57 39	265	66 124 75	Disd. Bone Ash and Glue	5	Sulphate of Ammonia alone.	10	27 45 47	119	9 29 27	65	45 86 44	175
174	42 85 47	58	20 27 11	91	28 45 18	Nothing.	12	Disd. Baker's Island Guano alone.	9	58 107 56	221	30 37 18	85	52 91 44	187
208	49 108 51	134	33 61 40	259	75 122 62	Disd. Coprolites and Glue.	4	Dissolved Bone Ash alone.	8	66 106 68	240	20 38 26	84	52 95 45	192
188	45 94 49	138	40 67 31	257	66 119 72	Disd. Baker's Island Guano and Sulphate of Ammonia.	3	Dissolved Coprolites alone.	7	64 109 61	234	24 40 27	91	47 90 43	180
197	47 98 52	138	29 63 46	268	60 124 84	Disd. Bone Ash & Sulphate of Ammonia.	2	Disd. Baker's Island Guano and Glue.	6	72 114 77	263	32 63 58	153	56 97 49	202
184	48 88 48	132	30 59 43	265	72 114 78	Disd. Coprolites & Sulphate of Ammonia.	1	Nothing.	12	24 40 26	93	21 26 16	63	47 97 49	193

SOUTH.

Table IV.—Giving the Results of the 1st Series of Experiments made at Saltcoats.

	N (1)			1			2			3			4			N (2)			5		
	No of Bulbs	Weight of Bulbs	Leaves	No of Bulbs	Weight of Bulbs	Leaves	No of Bulbs	Weight of Bulbs	Leaves	No of Bulbs	Weight of Bulbs	Leaves	No of Bulbs	Weight of Bulbs	Leaves	No of Bulbs	Weight of Bulbs	Leaves	No of Bulbs	Weight of Bulbs	Leaves
Outer Drills	96	53	37	113	141	84	105	146	64	103	135	63	97	133	63	89	72	40	101	132	67
Inner Drills.	97	40	26	95	109	52	94	119	58	97	114	62	98	112	60	83	29	16	98	109	68
Total..... .	193	93	63	205	250	136	199	265	122	200	249	125	195	245	123	172	101	56	199	241	135
	6			7			8			9			10			11			N (3)		
Outer Drills	105	149	90	90	125	51	97	134	46	96	114	48	89	74	36	94	41	28	89	46	31
Inner Drills.	97	114	63	90	109	40	95	106	38	91	107	37	86	45	29	98	40	28	85	45	27
Total.	202	203	153	180	234	91	192	240	84	187	221	85	175	119	65	192	81	56	174	91	58
	N (4)			1			2			3			4			5			6		
Outer Drills	84	39	23	96	150	73	99	144	75	94	138	71	100	138	73	96	141	64	102	147	61
Inner Drills.	91	49	36	88	114	59	98	124	63	94	119	67	103	122	61	96	124	57	97	120	52
Total......	175	88	59	184	265	132	198	268	138	188	257	138	203	259	134	192	265	121	199	267	113
	7			8			9			10			11								
Outer Drills.	104	100	36	95	115	35	105	120	40	97	56	34	82	34	23						
Inner Drills.	99	90	26	98	115	37	93	94	29	93	52	35	86	34	22						
Total.	203	190	62	193	230	72	198	214	69	190	108	72	168	68	45						

Table V.—Arranged plan of the 1st Series of Experiments made at Saltcoats, giving the produce in lbs per plot, or cwts. per acre, with the average of the two sections in tons and cwts.

	N				1				2				3				4				5			
	Bulbs.	Leaves	Gross.	Leaves p. cent.	Bulbs.	Leaves	Gross.	Leaves p. cent.	Bulbs.	Leaves.	Gross.	Leaves p. cent.	Bulbs.	Leaves.	Gross.	Leaves p. cent.	Bulbs.	Leaves.	Gross.	Leaves p. cent	Bulbs.	Leaves.	Gross.	Leaves p. cent.
Section I. .	194	119	313	61⅓	250	136	386	54⅕	265	122	387	46	249	125	374	50⅕	245	123	368	50·2	241	135	376	56⅓
Section II. .	179	117	296	65⅓	265	132	397	50	268	138	406	51·5	257	138	395	54	259	134	393	51·5	265	121	386	45⅔
Total . .	373	236	609	63¼	515	268	783	52	533	260	793	48·8	506	263	769	52	504	257	761	51	506	256	762	50⅓
Average .	93¼	59	152¼	63¼	257½	134	391½	52	266½	130	396½	48·8	253	131½	384½	52	252	128½	380½	51	253	128	381	50⅔
	Bulbs.		Leaves.		Bulbs.		Leaves.		Bulbs.		Leaves.		Bulbs.		Leaves.		Bulbs.		Leaves.		Bulbs.		Leaves.	
	Tons.	Cwts.	Tons.	Cwts.	Tons.	Cwts.	Tons.	Cwts.	Tons.	Cwts.	Tons.	Cwts.	Tons.	Cwts.	Tons.	Cwts.	Tons.	Cwts.	Tons.	Cwts.	Tons.	Cwts.	Tons.	Cwts.
Average per Acre in Tons & Cwts	4	13¼	2	19	12	17½	6	14	13	6½	6	10	12	13	6	11½	12	12	6	8½	12	13	6	8

	6				7				8				9				10				11			
	Bulbs	Leaves.	Gross.	Leaves p. cent.	Bulbs.	Leaves.	Gross.	Leaves p. cent	Bulbs.	Leaves.	Gross.	Leaves p cent.	Bulbs.	Leaves.	Gross.	Leaves p. cent.	Bulbs.	Leaves.	Gross.	Leaves p. cent.	Bulbs.	Leaves.	Gross.	Leaves p. cent.
Section I. .	268	153	416	58⅓	234	91	325	39	240	84	324	35	221	85	306	38½	119	65	184	54⅗	81	56	137	69⅐
Section II. .	267	113	380	42⅓	190	62	252	32½	230	72	302	31⅓	214	69	283	32¼	108	72	180	66⅔	68	45	113	66⅛
Total . .	530	266	796	50⅕	424	153	577	36	470	156	626	33⅕	435	154	589	35⅖	227	137	364	60⅖	149	101	250	68
Average .	265	133	398	50⅕	212	76½	288½	36	235	78	313	33⅕	267½	77	294½	35⅖	113½	68½	182	60·6	74½	50½	125	68
	Bulbs.		Leaves.		Bulbs.		Leaves.		Bulbs.		Leaves.		Bulbs.		Leaves.		Bulbs.		Leaves.		Bulbs.		Leaves.	
	Tons.	Cwts.	Tons.	Cwts.	Tons.	Cwts	Tons.	Cwts.	Tons.	Cwts.	Tons.	Cwts.	Tons.	Cwts.	Tons.	Cwts.	Tons.	Cwts.	Tons.	Cwts.	Tons.	Cwts.	Tons.	Cwts.
Average per Acre in Tons & Cwts	13	5	6	13	10	12	3	16½	11	15	3	18	11	7½	3	17	5	13½	3	8½	3	14½	2	10½

Table VI.—Giving the results of the 1st Series of Experiments made at Drylawhill.

No. of Bulbs.	Weight of Bulbs	Leaves	No of Bulbs	Weight of Bulbs.	Leaves	No. of Bulbs.	Weight of Bulbs.	Leaves.	No. of Bulbs.	Weight of Bulbs	Leaves	No of Bulbs.	Weight of Bulbs.	Leaves.	No. of Bulbs	Weight of Bulbs.	Leaves.	No. of Bulbs	Weight of Bulbs	Leaves.
	N (1)			1			2			3			4			N (2)			5	
147	228	72	148	300	95	154	327	86	166	325	89	165	228⅓	79	169	291	79⅓	170	339	92
	6			7			8			9			10			11			N (3)	
136	223	88	161	302½	87	168	342·	84⅙	162	317⅓	70⅓	172	339⅓	85	152	289	81⅓	148	289	77⅓
	N (4)			1			2			3			4			5			6	
161	270	64	176	256	—118	168	240	114	152	317	103	154	333	95	123	256	96⅓	141	258	97
	7			8			9			10			11							
159	326	71	152	267	78	163	274⅓	80	163	282	105	149	282	75						

Table VII.—Arranged Plan of the 1st Series of Experiments made at Drylawhill, giving the produce in lbs. per plot, or cwts. per acre, with the average of the two sections in tons and cwts.

	N.				1				2				3				4				5			
	Bulbs.	Leaves.	Gross.	Leaves p. cent.	Bulbs.	Leaves.	Gross.	Leaves p. cent.	Bulbs.	Leaves.	Gross.	Leaves p. cent	Bulbs.	Leaves.	Gross.	Leaves p. cent.	Bulbs.	Leaves.	Gross.	Leaves p. cent.	Bulbs.	Leaves.	Gross.	Leaves p. cent.
Section I. .	228	72	300	31·5	300	95	395	31·6	327	86	413	26.3	325	89	414	27·3	288·5	79	367·5	20·4	339	92	431	27·1
Section II. .	291	79·5	370·5	27·1	256	118	374	46·0	240	114	354	47.5	317	103	420	32 4	333	95	428	28 5	256	96·5	352·5	37·5
Total . .	519	151·5	670·5	29·0	556	213	769	38·3	567	200	767	35·2	642	192	834	29 9	621·5	174	795·5	28·0	595	188·5	783·5	31·5
Average .	259·5	75·7	335·2	28·9	278	106·5	384·5	38·1	283·5	100	383·5	35·3	321	96	417	29 9	310·2	87	397·7	28·0	297·5	94·2	391·7	31·6
	Bulbs.		Leaves.		Bulbs.		Leaves.		Bulbs.		Leaves.		Bulbs.		Leaves.		Bulbs.		Leaves.		Bulbs.		Leaves.	
	Tons.	Cwts.	Tons.	Cwts.	Tons.	Cwts.	Tons.	Cwts.	Tons.	Cwts.	Tons.	Cwts.	Tons.	Cwts.	Tons.	Cwts.	Tons.	Cwts.	Tons.	Cwts.	Tons.	Cwts.	Tons.	Cwts.
Average per Acre in Tons & Cwts	12	$19\frac{28}{112}$	3	$15\frac{42}{112}$	13	18	5	$6\frac{28}{112}$	14	$3\frac{28}{112}$	5	0	16	1	4	16	15	$10\frac{42}{112}$	4	7	14	$17\frac{98}{112}$	4	$14\frac{14}{112}$

	6				7				8				9				10				11			
	Bulbs.	Leaves.	Gross.	Leaves p. cent.	Bulbs.	Leaves.	Gross.	Leaves p. cent.	Bulbs.	Leaves.	Gross.	Leaves p. cent.	Bulbs.	Leaves.	Gross.	Leaves p. cent.	Bulbs.	Leaves.	Gross.	Leaves p. cent.	Bulbs.	Leaves.	Gross.	Leaves p. cent.
Section I. .	228	88	311	39·4	302·5	87	389·5	28·8	342	84·5	426·5	24·5	317·5	70·5	388	22·0	339·5	85	424·5	25·0	289	81·5	370·5	28 0
Section II. .	258	87	345	33·7	268	71	334	27·0	267	78	345	29·2	274 5	80	354·5	29·1	282	105	387	37 2	282	75	357	26·5
Total . .	481	175	656	36·3	565·5	158	728·5	27·9	609	162·5	771·5	26·6	592	150·5	742·5	25·3	621·5	190	811·5	30·5	571	156·5	727·5	27·3
Average .	240·5	87·5	328	36·2	282·7	79	371·7	28·0	304·5	81·2	385·7	26·6	296	75·2	371·2	25·3	310·7	95	405·7	30·6	285·5	78·2	363·7	27·3
	Bulbs.		Leaves.		Bulbs.		Leaves.		Bulbs.		Leaves.		Bulbs.		Leaves.		Bulbs.		Leaves.		Bulbs.		Leaves.	
	Tons.	Cwts.	Tons.	Cwts.	Tons.	Cwts.	Tons.	Cwts.	Tons.	Cwts.	Tons.	Cwts.	Tons.	Cwts.	Tons.	Cwts.	Tons.	Cwts.	Tons.	Cwts.	Tons.	Cwts.	Tons.	Cwts.
Average per Acre in Tons & Cwts	12	$0\frac{28}{112}$	4	$7\frac{28}{112}$	14	$2\frac{42}{112}$	3	19	15	$4\frac{28}{112}$	4	$1\frac{14}{112}$	14	16	3	$15\frac{14}{112}$	15	$10\frac{42}{112}$	4	15	14	$5\frac{28}{112}$	3	$18\frac{14}{112}$

Table VIII.—Giving the Results of the 1st Series of Experiments made at Snawdon.

No. of Bulbs	Weight of Bulbs	Weight of Leaves	No of Bulbs	Weight of Bulbs	Weight of Leaves	No of Bulbs	Weight of Bulbs	Weight of Leaves	No of Bulbs	Weight of Bulbs	Weight of Leaves	No of Bulbs	Weight of Bulbs	Weight of Leaves	No of Bulbs	Weight of Bulbs	Weight of Leaves	No of Bulbs	Weight of Bulbs	Weight of Leaves
	N (1)			1			2			3			4			N (2)			5	
196	134	34	217	283	103	220	287	100	230	304	108	235	290	100	208	126	32	243	300	109
	6			7			8			9			10			11			N (3)	
213	266	100	210	139	73	225	206	58	231	164	48	183	147	56	187	133	52	125	126	44
	N (4)			1			2			3			4			5			6	
155	31	4	195	273	88	193	270	96	198	284	103	198	282	93	239	335	119	207	280	97
	7			8			9			10			11							
208	252	79	213	249	91	206	245	75	20[illegible]	130	80	198	112	69						

Table IX.—Arranged plan of the 1st Series of Experiments made at Snawdon, giving the produce in lbs. per plot, or cwts. per acre, with the average of the two sections in tons and cwts.

	N				1				2				3				4				5			
	Bulbs.	Leaves.	Gross.	Leaves p. cent.	Bulbs.	Leaves.	Gross.	Leaves p. cent.	Bulbs.	Leaves.	Gross.	Leaves p. cent.	Bulbs.	Leaves.	Gross.	Leaves p. cent.	Bulbs.	Leaves.	Gross.	Leaves p. cent.	Bulbs.	Leaves.	Gross.	Leaves p. cent.
Section I.	134	34	168	25·3	283	103	386	36·3	287	100	387	34·8	304	108	412	35·5	390	100	290	34·4	300	100	409	36·3
Section II.	126	32	158	25·3	273	88	361	32·2	270	96	366	35·5	284	103	387	36 2	282	93	375	33·0	335	119	454	35·8
„ I. N.	126	44	170	34																				
„ II. N.	84	40	124	48																				
Total,	470	150	620	32	556	191	747		557	196	753		588	211	799		572	193	765		635	228	863	
Average,	117	37	154	31	278	95	373	34·2	278	98	376	35·1	294	105	399	35·8	286	96	382	33·7	317	114	431	36 0
	Bulbs.		Leaves.		Bulbs.		Leaves.		Bulbs.		Leaves.		Bulbs.		Leaves.		Bulbs.		Leaves.		Bulbs.		Leaves.	
	Tons.	Cwts.	Tons.	Cwts.	Tons.	Cwts.	Tons.	Cwts.	Tons.	Cwts.	Tons.	Cwts.	Tons.	Cwts.	Tons.	Cwts.	Tons.	Cwts.	Tons.	Cwts.	Tons.	Cwts.	Tons.	Cwts.
Average per Acre in Tons & Cwts	5	17	1	17	13	18	4	15	13	18	4	18	14	14	5	5	14	6	4	16	15	17	5	14

	6				7				8				9				10				11			
	Bulbs.	Leaves.	Gross.	Leaves p. cent.	Bulbs.	Leaves.	Gross.	Leaves p. cent.	Bulbs.	Leaves.	Gross.	Leaves p. cent.	Bulbs.	Leaves.	Gross.	Leaves p. cent.	Bulbs.	Leaves.	Gross.	Leaves p. cent.	Bulbs.	Leaves.	Gross.	Leaves p. cent.
Section I.	266	100	366	37·9	139	173	312	124	206	58	264	28	164	48	212	29	147	56	203	38	133	52	185	39
Section II.	280	97	377	34·6	252	79	331	30	249	91	340	36	245	75	320	30	130	80	210	61	112	59	171	53
Total,	546	197	743		391	252	643		455	149	604		409	123	532		277	136	413		245	111	356	
Average.	273	98	371	36.2	195	126	321	77	227	74	302	32	204	61	266	29	138	68	206	49	122	55	178	46
	Bulbs.		Leaves.		Bulbs.		Leaves.		Bulbs.		Leaves.		Bulbs.		Leaves.		Bulbs.		Leaves.		Bulbs.		Leaves.	
	Tons.	Cwts.	Tons.	Cwts.	Tons.	Cwts.	Tons.	Cwts.	Tons.	Cwts.	Tons.	Cwts.	Tons.	Cwts.	Tons.	Cwts.	Tons.	Cwts.	Tons.	Cwts.	Tons.	Cwts.	Tons.	Cwts.
Average per Acre in Tons & Cwts	13	13	4	18	9	15	6	6	11	7	3	14	10	4	3	1	6	18	3	8	6	2	2	15

Table X.—Giving the Results of the 1st Series of Experiments made at Rumbleton.

	N (1)			1			2			3			4			N (2)			5		
	No. of Bulbs.	Weight of		No. of Bulbs.	Weight of		No. of Bulbs.	Weight of		No. of Bulbs.	Weight of		No. of Bulbs.	Weight of		No of Bulbs.	Weight of		No. of Bulbs	Weight of	
		Bulbs.	Leaves		Bulbs.	Leaves		Bulbs.	Leaves.		Bulbs.	Leaves.		Bulbs.	Leaves		Bulbs.	Leaves.		Bulbs.	Leaves.
Outer Drills,	110	98	31	110	124	47	110	113	51	92	105	46	112	108	42	110	80	22	94	65	31
Inner Drills,	85	89	20	98	104	40	110	93	56	105	110	53	110	113	38	120	90	34	94	64	40
Total, ...	195	187	51	208	228	87	220	206	107	197	215	99	222	221	80	230	170	56	188	129	71
	6			7			8			9			10			11			N (3)		
Outer Drills,	95	84	38	113	123	35	114	121	28	110	119	35	94	87	26	102	109	37	109	116	30
Inner Drills,	112	98	50	121	145	39	109	129	34	116	124	37	92	90	35	116	114	49	108	109	32
Total, ...	207	182	88	234	268	74	223	250	62	226	243	72	186	177	61	218	223	86	217	225	62
	N (4)			1			2			3			4			5			6		
Outer Drills,	93	54	20	100	58	35	88	72	21	97	82	39	101	87	45	95	76	39	100	108	37
Inner Drills,	100	76	30	107	83	46	101	82	29	100	70	45	106	81	45	110	68	45	93	86	47
Total, ...	193	130	50	207	141	81	189	154	50	197	152	84	207	168	90	205	144	84	193	194	84
	7			8			9			10			11								
Outer Drills,	97	133	39	116	140	37	114	131	40	99	81	32	94	69	32						
Inner Drills,	115	156	42	102	129	32	114	143	46	108	95	52	110	88	39						
Total, ...	212	289	81	218	269	69	228	274	86	207	176	84	204	157	71						

Table XIII.—Arranged Results of the 1st Series of Experiments made at Boysack, giving the average of the two sections in cwts. per acre, as also in tons and cwts.

	N				1				2				3				4				5			
	Bulbs.	Leaves.	Gross.	Leaves p. cent.	Bulbs.	Leaves.	Gross.	Leaves p. cent.	Bulbs.	Leaves.	Gross.	Leaves p. cent.	Bulbs.	Leaves.	Gross.	Leaves p. cent.	Bulbs.	Leaves.	Gross.	Leaves p. cent.	Bulbs.	Leaves.	Gross.	Leaves p. cent.
Section I. .	263	46	309	17·7	318	53	371	16·6	344	37	381	10·7	316	41	357	12·9	458	67	525	14·6	389	66	455	17·4
Section I.[1] .	243	45	288																					
Section II. .	276	44	329	17·3	301	53	354	17·6	183	48	231	26·2	271	62	333	22·8	368	67	435	18·2	385	72	457	18·7
Section II.[1]	241	40	281																					
Total, . . .	1023	185	1198		619	106	725		527	85	612		587	103	690		826	134	960		774	138	912	
Average . .	511	67	599	17·5	309	53	362	17·1	263	42	305	18·4	293	52	345	17·8	413	67	480	16·4	387	69	456	18·

	N				1				2				3				4				5			
	Bulbs.		Leaves.		Bulbs.		Leaves.		Bulbs.		Leaves.		Bulbs.		Leaves.		Bulbs.		Leaves.		Bulbs.		Leaves.	
	Tons.	Cwts.	Tons.	Cwts.	Tons.	Cwts.	Tons.	Cwts.	Tons.	Cwts.	Tons.	Cwts.	Tons.	Cwts.	Tons.	Cwts.	Tons.	Cwts.	Tons.	Cwts.	Tons.	Cwts.	Tons.	Cwts.
Average per Acre in Tons & Cwts	12	13	2	4	15	9	2	13	13	3	2	2	14	13	2	12	20	13	3	7	19	2	3	9

	6				7				8				9				10				11			
	Bulbs.	Leaves.	Gross.	Leaves p. cent.	Bulbs.	Leaves.	Gross.	Leaves p. cent.	Bulbs.	Leaves.	Gross.	Leaves p. cent.	Bulbs.	Leaves.	Gross.	Leaves p. cent.	Bulbs.	Leaves.	Gross.	Leaves p. cent.	Bulbs.	Leaves.	Gross.	Leaves p. cent.
Section I. .	317	67	384	21·1	323	29	352	9·9	361	38	399	10·5	280	44	324	15·7	262	52	314	19·8	286	64	350	25·8
Section II. .	306	70	376	22·9	317	45	362	14·1	315	55	370	17·4	286	37	323	13·2	260	54	314	20 7	262	39	301	14·8
Total . . .	623	137	760		640	74	714		676	93	769		566	81	647		522	106	628		548	103	651	
Average . .	311	68	379	22·	320	37	357	12·	338	46	384	13·9	283	40	323	14·4	261	53	314	20·2	274	51	325	20·3

	6				7				8				9				10				11			
	Bulbs.		Leaves.		Bulbs.		Leaves.		Bulbs.		Leaves.		Bulbs.		Leaves.		Bulbs.		Leaves.		Bulbs.		Leaves.	
	Tons.	Cwts.	Tons.	Cwts.	Tons.	Cwts.	Tons.	Cwts.	Tons.	Cwts.	Tons.	Cwts.	Tons.	Cwts.	Tons.	Cwts.	Tons.	Cwts.	Tons.	Cwts.	Tons.	Cwts.	Tons.	Cwts.
Average per Acre in Tons & Cwts	15	11	3	8	16	0	1	17	16	18	2	6	14	0	2	0	13	1	2	13	13	14	2	11

Table XIV.—Giving the results of the 1st Series of Experiments made at Leuchland, Forfarshire. Weighed 5th December.

No. of Bulbs.	Weight of		No. of Bulbs.	Weight of		No. of Bulbs.	Weight of		No. of Bulbs	Weight of		No. of Bulbs	Weight of		No. of Bulbs.	Weight of		No. of Bulbs	Weight of	
	Bulbs.	Leaves.		Bulbs.	Leaves.		Bulbs.	Leaves.		Bulbs	Leaves		Bulbs.	Leaves.		Bulbs	Leaves.		Bulbs.	Leaves.
	N (1)			1			2			3			4			N (2)			5	
	451	72		484	95		500	91		495	94		506	95		427	70		100	98
	6			7			8			9			10			11			N (3)	
	529	97		470	68		473	68		478	72		469	105		479	103		404	71
	N (4)			1			2			3			4			5			6	
	412	63		509	100		531	98		507	97		527	97		524	93		508	101
	7			8			9			10			11							
	414	76		462	84		474	78		455	94		445	90						

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Table XV.—Arranged plan of the 1st Series of Experiments made at Leuchland, giving the produce in lbs. per plot, or cwts. per acre, with average of the two sections in tons and cwts.

	N				1				2				3				4				5			
	Bulbs.	Leaves.	Gross.	Leaves p. cent.	Bulbs.	Leaves.	Gross.	Leaves p. cent.	Bulbs.	Leaves.	Gross.	Leaves p. cent.	Bulbs.	Leaves.	Gross.	Leaves p. cent.	Bulbs.	Leaves.	Gross.	Leaves p. cent.	Bulbs.	Leaves.	Gross.	Leaves p. cent.
Section I. .	430	71	510	16·1	484	95	579	19·6	500	91	591	18·2	495	94	589	19·0	506	95	601	18·7	501	93	594	18·5
Section II. .	408	67	475	16·4	509	100	609	19 6	531	98	629	18·4	507	97	604	19·1	527	97	624	18·4	524	93	617	17·7
Total, . . .	847	138	985		993	195	1188		1031	189	1220		1002	191	1193		1033	192	1225		1025	186	1211	
Average, .	423½	69	492½	16·3	496½	97½	594	19·6	515½	94½	610	18·3	501	95½	596½	19·6	516½	96	612½	18·5	512½	93	605½	18·1
	Bulbs.		Leaves.		Bulbs.		Leaves.		Bulbs.		Leaves.		Bulbs.		Leaves.		Bulbs.		Leaves.		Bulbs.		Leaves.	
	Tons.	Cwts.	Tons.	Cwts.	Tons.	Cwts.	Tons.	Cwts.	Tons.	Cwts.	Tons.	Cwts.	Tons.	Cwts.	Tons.	Cwts.	Tons.	Cwts.	Tons.	Cwts.	Tons.	Cwts.	Tons.	Cwts.
Average per acre in tons and cwts.	21	3½	3	9	24	16½	4	17½	25	15½	4	14½	25	1	4	15½	25	16½	4	16	25	12½	4	13

	6				7				8.				9				10				11			
	Bulbs.	Leaves	Gross.	Leaves p. cent.	Bulbs.	Leaves.	Gross.	Leaves p. cent.	Bulbs.	Leaves.	Gross.	Leaves p. cent.	Bulbs.	Leaves.	Gross.	Leaves p. cent.	Bulbs.	Leaves.	Gross.	Leaves p. cent.	Bulbs.	Leaves.	Gross.	Leaves p. cent.
Section I. .	529	97	626	18·3	470	68	538	14·4	473	68	541	14·3	478	72	550	15·1	469	105	574	22·4	479	103	582	21·5
Section II. .	508	101	609	19·8	414	76	490	18·3	462	84	546	18·2	474	78	552	16·5	455	94	549	20·7	445	90	535	20·2
Total, . .	1037	198	1235		884	144	1028		935	152	1087		952	150	1102		924	199	1123		924	193	1117	
Average, .	518½	99	617½	19·1	442	72	514	16·3	467½	76	543½	16·2	476	75	551	15·8	462	99½	561½	21·5	462	96½	588½	20·9
	Bulbs.		Leaves.		Bulbs.		Leaves.		Bulbs.		Leaves.		Bulbs.		Leaves.		Bulbs.		Leaves.		Bulbs.		Leaves.	
	Tons.	Cwts.	Tons.	Cwts.	Tons.	Cwts.	Tons.	Cwts.	Tons.	Cwts.	Tons.	Cwts.	Tons.	Cwts.	Tons	Cwts.	Tons.	Cwts.	Tons.	Cwts.	Tons.	Cwts.	Tons.	Cwts.
Average per acre in tons and cwts.	25	18½	4	19	22	2	3	12	23	7½	3	16	23	16	3	15	23	2	4	19½	23	2	4	16½

Table XVI.—Arranged plan of the 1st Series of Experiments made at West Drums, Brechin, Forfarshire, giving the produce in lbs. per plot, or cwts. per acre, with the average of the two sections in tons and cwts.

	N				1				2				3				4				5			
	Bulbs.	Leaves.	Gross.	Leaves p. cent.	Bulbs.	Leaves.	Gross.	Leaves. p. cent.	Bulbs.	Leaves.	Gross.	Leaves p. cent	Bulbs.	Leaves.	Gross.	Leaves p. cent.	Bulbs.	Leaves.	Gross.	Leaves p. cent.	Bulbs.	Leaves	Gross.	Leaves p. cent.
Section I. .	100	20	120		360	56	416		304	68	372		248	48	296		324	64	388		356	120	476	
Section II. .	28	12	40		328	68	396		376	56	432		252	64	316		340	72	412		336	84	420	
Total . . .	128	32	160		688	124	812		680	124	804		500	112	612		664	136	800		692	204	896	
Average . .	64	16	80	25	344	62	406	18	340	62	402	18·2	250	56	306	22·4	332	68	400	20·48	346	102	448	29·48
	Bulbs.		Leaves.		Bulbs.		Leaves.		Bulbs.		Leaves.		Bulbs.		Leaves.		Bulbs.		Leaves.		Bulbs.		Leaves.	
	Tons.	Cwts.	Tons.	Cwts	Tons.	Cwts.	Tons.	Cwts	Tons.	Cwts.	Tons.	Cwts.	Tons.	Cwts.	Tons.	Cwts.	Tons.	Cwts.	Tons.	Cwts.	Tons.	Cwts.	Tons.	Cwts.
Average per acre in tons and cwts.	3	4		16	17	4	3	2	17	0	3	2	12	10	2	16	16	12	3	8	17	6	5	2
	6				7				8				9				10				11			
	Bulbs.	Leaves.	Gross.	Leaves p. cent.	Bulbs.	Leaves.	Gross.	Leaves p. cent.	Bulbs.	Leaves	Gross.	Leaves p. cent.	Bulbs.	Leaves.	Gross.	Leaves p. cent.	Bulbs.	Leaves.	Gross.	Leaves p. cent.	Bulbs.	Leaves.	Gross.	Leaves p. cent.
Section I. .	276	72	348		328	48	376		288	40	328		288	40	328		128	40	168		60	24	84	
Section II. .	352	64	416		320	36	356		340	44	384		376	44	420		136	36	172		72	24	96	
Total . . .	628	136	764		648	84	732		628	84	712		664	84	748		264	76	340		132	48	180	
Average . .	314	68	382	21·6	324	42	366	12·9	314	42	356	13·3	332	42	374	12·6	132	38	170	28·79	66	24	90	36·36
	Bulbs.		Leaves.		Bulbs.		Leaves.		Bulbs.		Leaves.		Bulbs.		Leaves.		Bulbs.		Leaves.		Bulbs.		Leaves.	
	Tons.	Cwts.	Tons.	Cwts.	Tons.	Cwts.	Tons.	Cwts.	Tons.	Cwts.	Tons.	Cwts.	Tons.	Cwts.	Tons.	Cwts.	Tons.	Cwts.	Tons.	Cwts.	Tons.	Cwts.	Tons.	Cwts.
Average per acre in tons and cwts.	15	14	3	8	16	4	2	2	15	14	2	2	16	12	2	2	6	12	1	18	3	6	1	4

Table XIX.—Giving the results of the 1st Series of Experiments made at Highfield, St. Quivox, Ayr.

	N (1)			1			2			3			4			N (2)			5		
	No of Bulbs	Weight of Bulbs	Weight of Leaves.	No of Bulbs.	Weight of Bulbs	Weight of Leaves	No of Bulbs	Weight of Bulbs	Weight of Leaves	No of Bulbs	Weight of Bulbs	Weight of Leaves	No of Bulbs	Weight of Bulbs	Weight of Leaves	No of Bulbs	Weight of Bulbs	Weight of Leaves	No of Bulbs	Weight of Bulbs	Weight of Leaves.
Outer Drills,..	..	31½	8	..	78½	29	55	51	18½	56	56	15½	70	71	15½	39	18	5	72	56½	16
Inner Drills,..	..	26½	8	..	127	49½	102	95	37	92	84½	32	108	109½	33-	48	15½	5½	110	91	29
Total,........	..	58	16	..	205½	68½	157	146	55½	148	140½	47½	178	180½	49	87	33½	10½	182	147½	45
	6			7			8			9			10			11			N (3)		
Outer Drills,..	..	67½	26½	58	68	12	59	66	17½	50	67	18	49	38½	10½	32	19	5	50	21½	6½
Inner Drills,..	..	84½	43	95	87	18½	104	101	25½	102	91½	27	57	29	10	45	17½	7	60	22	8
Total,........	..	152	69½	153	155	30½	163	167	43	152	158½	45	106	67½	20½	77	36½	12	110	43½	14½
	N (4)			1			2			3			4			5			6		
Outer Drills,..	42	25½	9½	55	63	13	60	99	19	56	86	15½	57	73	14½	57	82	27½	58	60	17
Inner Drills,..	85	47	15	100	128	28½	114	171½	29	103	127	25½	97	130	32½	100	118	44	80	95	29½
Total,........	127	72½	24½	155	191	41½	174	270½	48	159	213	41	154	203	47	157	200	71½	138	155	46½
	7			8			9			10			11								
Outer Drills,..	56	58	9½	61	86	14	63	90	12	54	49	11	46	29½	8½						
Inner Drills,..	111	98	15	117	123	20	114	131	17½	62	52½	13	81	46	12½						
Total,........	167	156	24½	178	209	34	177	221	29½	116	101½	24	127	75½	20½						

Table XX.—Arranged plan of the 1st Series of Experiments made at Highfield, St. Quivox, Ayr, giving the produce in lbs. per plot, or cwts. per acre, with the average of the two sections in tons and cwts.

	N				1				2				3				4				5			
	Bulbs.	Leaves.	Gross.	Leaves p. cent.	Bulbs.	Leaves.	Gross.	Leaves p. cent.	Bulbs	Leaves.	Gross.	Leaves p. cent.	Bulbs	Leaves	Gross.	Leaves p. cent.	Bulbs	Leaves	Gross.	Leaves p cent.	Bulbs.	Leaves.	Gross.	Leaves p. cent.
Section I. .	45¾	13¼	59	28·8	205½	68½	274	33·1	146	55½	201½	37·6	140½	47½	188	33·5	180½	49	229½	27·2	147½	45	192½	31·2
Section II. .	58	19¼	77¼	32·7	191	41½	232½	21·4	270½	48	318½	17·7	213	41	254	19·2	203	47	250	23·1	200	71½	271½	35·5
Total . . .	103¾	32½	136¼	31·0	396½	110	506½	28·2	416½	103½	520	24·7	353½	88½	442	24·6	383½	96	479½	25·0	347½	116½	464	33·4
Average . .	qrs. lbs. 51 3 14	16¼	qrs. lbs. 68 0 14	31·3	198¼	55	253¼	27·7	208¼	51¾	260	24·5	176¾	44¼	221	25·0	191¾	48	239¾	25·1	173¾	58¼	232	33·5
	Bulbs.		Leaves.		Bulbs.		Leaves.		Bulbs.		Leaves.		Bulbs.		Leaves.		Bulbs.		Leaves.		Bulbs.		Leaves.	
	Tons.	Cwts.	Tons.	Cwts.	Tons.	Cwts.	Tons.	Cwts.	Tons.	Cwts.	Tons.	Cwts.	Tons.	Cwts.	Tons.	Cwts.	Tons.	Cwts.	Tons.	Cwts.	Tons.	Cwts.	Tons.	Cwts.
Average per Acre in Tons & Cwts.	2	qrs. lbs. 11 3 14	..	16½	9	18	2	15	10	8¼	2	11¾	8	16¾	2	4½	9	11¾	2	8	8	18¾	2	18¼

	6				7				8				9				10				11			
	Bulbs.	Leaves.	Gross.	Leaves p. cent	Bulbs.	Leaves.	Gross.	Leaves p. cent.	Bulbs.	Leaves.	Gross.	Leaves p. cent	Bulbs.	Leaves.	Gross.	Leaves p. cent.	Bulbs.	Leaves.	Gross.	Leaves p. cent.	Bulbs.	Leaves.	Gross.	Leaves p cent.
Section I. .	152	69½	221½	45·3	155	30½	185½	19·3	167	43	210	25·7	158½	45	203½	28·4	67½	20½	88	29·8	36½	12	48½	33·3
Section II. .	155	46½	201½	29·8	156	24½	180½	15·4	209	34	243	16·2	221	29½	250½	13·1	101½	24	125½	23·7	75½	20½	96	26·6
Total . . .	307	116	423	37·7	311	55	366	17·6	376	77	453	20·4	379½	74½	454	19·5	169	44½	213½	26·0	112	32½	144½	28·5
Average . .	153½	58	211½	37·9	155½	27½	183	17·4	188	38½	226½	20·2	189¾	37¼	227	19·5	84½	22¼	106¾	26·1	56	16¼	72¼	28·5
	Bulbs.		Leaves.		Bulbs.		Leaves.		Bulbs.		Leaves.		Bulbs.		Leaves.		Bulbs.		Leaves.		Bulbs.		Leaves.	
	Tons.	Cwts.	Tons.	Cwts.	Tons.	Cwts.	Tons.	Cwts.	Tons.	Cwts.	Tons	Cwts.	Tons.	Cwts.	Tons.	Cwts.	Tons.	Cwts.	Tons.	Cwts.	Tons.	Cwts.	Tons.	Cwts.
Average per Acre in Tons & Cwts.	7	13½	2	18	7	15½	1	7½	9	8	1	18½	9	9¾	1	17¼	4	4½	1	2½	2	16	...	16¼

Table XXI.—Giving the results of the 1st Series of Experiments, 1st Division, made by Mr. Swanwick.

No of Bulbs	Weight of Bulbs	Leaves	No of Bulbs	Weight of Bulbs.	Leaves	No of Bulbs	Weight of Bulbs	Leaves.	No of Bulbs	Weight of Bulbs	Leaves	No of Bulbs	Weight of Bulbs	Leaves	No of Bulbs.	Weight of Bulbs	Leaves	No of Bulbs	Weight of Bulbs	Leaves
	N (1)			1			2			3			4			N (2)			5	
103	37	5	152	156	23	140	158	24	191	192	85	161	161	25	89	31	7	144	141	25
	6			7			8			9			10			11			N (3)	
161	163	31	192	115	18	188	122	21	196	181	21	117	40	9	109	42	9	93	35	7
	N (4)			1			2			8			4			5			6	
96	37	7	208	170	35	209	195	35	262	193	36	207	170	41	225	192	47	194	170	28
	7			8			9			10			11							
202	112	16	144	84	12	144	111	18	93	84	8	144	49	11						

Table XXII.—Arranged plan of the 1st Series of Experiments, 1st Division, made in Wiltshire, by Mr Swanwick, giving the produce in lbs. per plot, or cwts. per acre, with the average of the two sections in tons and cwts.

	N				1				2				3				4				5			
	Bulbs.	Leaves.	Gross.	Leaves p. cent	Bulbs.	Leaves.	Gross.	Leaves p. cent.	Bulbs.	Leaves.	Gross.	Leaves p. cent,	Bulbs.	Leaves.	Gross.	Leaves p. cent.	Bulbs.	Leaves.	Gross.	Leaves p. cent.	Bulbs.	Leaves.	Gross.	Leaves p. cent
Section 1.[1] .	37	5	42	13·5																				
Section I.[2] .	31	7	38	22·6	156	23	179	14·7	158	24	182	15·2	192	35	227	18·2	161	25	186	15·5	141	25	166	17·7
Section II.[1]	35	7	42	20·0																				
Section II.[2]	37	7	44	18·9	170	35	205	20·6	195	35	230	17·9	193	36	229	18·6	170	41	211	24·1	192	47	239	22·5
Total, . .	140	26	166		326	58	384		353	59	412		385	71	456		331	66	397		333	72	405	
Average, .	35	65	41·5	18·8	163	29	192	17·7	176·5	29·5	206	16·5	192·5	35·5	228	18·4	165·5	33	198·5	19·8	166 5	36	202·5	20·1
	Bulbs.		Leaves.		Bulbs.		Leaves.		Bulbs.		Leaves.		Bulbs.		Leaves.		Bulbs.		Leaves.		Bulbs.		Leaves.	
	Tons.	Cwts.	Tons	Cwts.	Tons.	Cwts.	Tons.	Cwts.	Tons.	Cwts.	Tons.	Cwts.	Tons.	Cwts.	Tons.	Cwts	Tons.	Cwts.	Tons.	Cwts.	Tons.	Cwts.	Tons.	Cwts.
Average per acre in tons and cwts.	1	15	0	6·5	8	3	1	9	8	16·5	1	9·5	0	12·5	1	15 5	8	5·5	1	13	8	6·5	1	16

	6				7				8				9				10				11			
	Bulbs.	Leaves	Gross.	Leaves p. cent	Bulbs.	Leaves.	Gross.	Leaves p. cent.	Bulbs.	Leaves.	Gross.	Leaves p. cent.	Bulbs.	Leaves.	Gross.	Leaves p. cent	Bulbs.	Leaves.	Gross.	Leaves p. cent.	Bulbs.	Leaves.	Gross.	Leaves p. cent.
Section I. .	168	31	194	19·0	115	18	133	15·6	122	21	143	17·2	131	21	152	16	40	9	49	22·5	42	9	51	21·4
Section II. .	170	28	198	16·5	112	16	128	14·3	84	12	96	14·3	111	18	129	16·2	34	8	42	23·5	49	11	60	22·5
Total, . .	338	59	392		227	34	261		206	33	239		242	39	281		74	17	21		91	20	111	
Average, .	166·5	29·5	196	17·7	113·5	17	130 5	14·9	103	16·5	119·5	15·7	121	19·5	140·5	16·1	37	8·5	45·5	23	45·5	10	55·5	21·9
	Bulbs.		Leaves.		Bulbs.		Leaves.		Bulbs.		Leaves.		Bulbs.		Leaves.		Bulbs.		Leaves.		Bulbs.		Leaves.	
	Tons.	Cwts.	Tons.	Cwts.	Tons.	Cwts.	Tons.	Cwts.	Tons.	Cwts.	Tons.	Cwts.	Tons.	Cwts.	Tons.	Cwts.	Tons.	Cwts.	Tons.	Cwts.	Tons.	Cwts.	Tons.	Cwts.
Average per acre in tons and cwts.	8	6·5	1	9·5	5	13	0	17	5	3	0	16·5	6	1	0	19·5	1	17	0	8·5	2	5·5	0	10

Table XXIII.—Giving the results of the 1st Series of Experiments, 2nd Division, made by Mr. Swanwick, Wilts.

No of Bulbs	Weight of		No of Bulbs	Weight of		No of Bulbs	Weight of		No of Bulbs	Weight of		No of Bulbs	Weight of		No of Bulbs	Weight of		No of Bulbs	Weight of	
	Bulbs	Leaves		Bulbs	Leaves		Bulbs	Leaves		Bulbs	Leaves		Bulbs	Leaves		Bulbs	Leave		Bulbs	Leaves
	N (1)			1			2			3			4			N (2)			5	
125	42	8	250	177	51	204	100	46	212	139	30	163	147	42	128	53	7	155	131	27
	6			7			8			9			10			11			N (3)	
200	166	30	196	115	21	176	100	30	240	100	29	150	48	15	188	66	19	135	68	12
	N (4)			1			2			3			4			5			6	
152	56	8	257	191	36	236	219	41	228	209	39	240	176	34	204	140	22	242	200	44
	7			8			9			10			11							
232	102	24	229	126	19	245	145	26	189	94	19	177	71	13						

Table XXIV.—Arranged plan of the 1st Series of Experiments, 2nd Division, by Mr. Swanwick, giving the produce in lbs. per plot, or cwts. per acre, with the average of the two sections in tons and cwts.

	N				1				2				3				4				5			
	Bulbs.	Leaves.	Gross.	Leaves p. cent.	Bulbs.	Leaves.	Gross.	Leaves p. cent.	Bulbs.	Leaves.	Gross.	Leaves p. cent.	Bulbs.	Leaves.	Gross.	Leaves p. cent.	Bulbs.	Leaves.	Gross.	Leaves p. cent.	Bulbs.	Leaves.	Gross.	Leaves p. cent.
Section I. .	53	7	60	13·2	177	51	228	28·8	155	46	201	29·7	139	30	169	21·5	147	42	189	28·8	131	27	158	20·6
Section I. (3.)	42	8	50	19																				
Section II. .	56	8	64	14·3	191	36	227	18·8	219	41	260	18·7	209	39	248	18·6	176	34	210	20·5	140	22	162	15·7
Section II. (4.)	68	12	80	17·6																				
Total . . .	219	35	254		368	87	455		374	87	461		348	69	417		323	76	399		271	49	320	
Average . .	54·7	8·7	63·5	16·2	184	43·5	227·5	23·8	187	43·5	230·5	24·2	174	34·5	208·5	20·1	161·5	38	199·5	24·6	135·5	24·5	160	18·1

	N				1				2				3				4				5			
	Bulbs.		Leaves.		Bulbs.		Leaves.		Bulbs.		Leaves.		Bulbs.		Leaves.		Bulbs.		Leaves.		Bulbs.		Leaves.	
	Tons.	Cwts.	Tons.	Cwts.	Tons.	Cwts.	Tons.	Cwts.	Tons.	Cwts.	Tons.	Cwts.	Tons.	Cwts.	Tons.	Cwts.	Tons.	Cwts.	Tons.	Cwts.	Tons.	Cwts.	Tons.	Cwts.
Average per Acre in Tons & Cwts.	2	14·7	0	8·7	9	4	2	3·5	9	7	2	3·5	8	14	1	14·5	8	1·5	1	18	6	15·5	1	4·5

	6				7				8				9				10				11			
	Bulbs.	Leaves.	Gross.	Leaves p. cent.	Bulbs.	Leaves.	Gross.	Leaves p. cent.	Bulbs.	Leaves.	Gross.	Leaves p. cent.	Bulbs.	Leaves	Gross.	Leaves p. cent.	Bulbs.	Leaves.	Gross.	Leaves p. cent.	Bulbs.	Leaves.	Gross.	Leaves p. cent.
Section I. .	166	30	196	18·1	115	21	136	18·3	150	30	180	20	155	29	184	18·7	48	15	63	31·3	66	19	85	28·8
Section II. .	200	44	244	22	152	24	176	15·8	126	19	145	15	145	26	171	17·9	94	19	113	20·2	71	13	84	18·3
Total, . .	366	74	440		267	45	312		276	49	325		300	55	355		142	34	176		137	32	169	
Average . .	183	37	220	20	133·5	22·5	156	17	138	24·5	162·5	17·5	150	27·5	177·5	18 3	71	17	88	25·7	68·5	16	84·5	23·5

	6				7				8				9				10				11			
	Bulbs.		Leaves.		Bulbs.		Leaves.		Bulbs.		Leaves.		Bulbs.		Leaves.		Bulbs.		Leaves.		Bulbs.		Leaves.	
	Tons.	Cwts.	Tons.	Cwts.	Tons.	Cwts.	Tons.	Cwts.	Tons.	Cwts.	Tons.	Cwts.	Tons.	Cwts.	Tons.	Cwts.	Tons.	Cwts.	Tons.	Cwts.	Tons.	Cwts.	Tons.	Cwts.
Average per Acre in Tons & Cwts.	9	3	1	17	6	13·5	1	2·5	6	18	1	4·5	7	10	1	7·5	3	11	0	17	3	8·5	0	16

PREMIUMS AWARDED BY THE SOCIETY IN 1866.

I.—REPORTS, &c.

1. £20 to Robert Hutchison, of Carlowrie, Kirkliston, for a Report on the Dietaries of Scotch Agricultural Labourers.
2. The Gold Medal or £10 to John Grigor, Forres Nurseries, Forres, for a Report on the Larch Forests of Scotland.
3. The Gold Medal or £10 to Christopher Young Michie, Forester, Cullen House, Cullen, Banffshire, for a Report on Planting on Exposed or on Barren Tracts.
4. The Gold Medal or £10 to John Morrison, Coney Park Nursery, Stirling, for a Report on the Best Mode of Cultivating Turnips with a view to Saving Seed.
5. The Gold Medal or £10 to Russell Swanwick, Whittington, Chesterfield, Derbyshire, for a Report of Experiments on Rye Grass and Clover with different top dressings (Crop 1865), conducted on the Farm of Fenton Barns, East Lothian.
6. The Medium Gold Medal or £5 to Russell Swanwick, Whittington, Chesterfield, for a Report of Experiments on the comparative effects of different special Manures on Wheat by top dressing, crop 1865, conducted on the Farm of Fenton Barns.
7. The Medium Gold Medal or £5 to Christopher Young Michie, Forester, Cullen House, for a Report on the Varieties of Poplar best suited to the Climate of Scotland.
8. The Medium Gold Medal or £5 to William Walker, Ardhuncart, Mossat, Aberdeenshire, for a Report of Experiments with different special Manures on Oats by top dressing, crop 1865.
9. The Silver Medal to Robert Hutchison, of Carlowrie, Kirkliston, for a Report on the Varieties of Poplar best suited to the climate of Scotland.
10. The Silver Medal to Russell Swanwick, Whittington, Chesterfield, for a Report of Experiments on the comparative effects of different special Manures on Turnips by top dressing, (crop 1865), conducted on the Farm of Fenton Barns.
11. The Silver Medal to Thomas Clark, Craibstone, Auchmill, Aberdeen, for Dressing Fanners, exhibited at the Inverness Show, 1865, and since reported on.
12. The Silver Medal to William Mackenzie, Knock, Keith, for Improved Drill Plough, exhibited at the Inverness Show 1865, and since reported on.

II.—DISTRICT COMPETITIONS.

DRAUGHT HORSES.

The District of Perth, Fife, Kinross, and Clackmannan.

STALLIONS	. John Macdonald, Duntocher . .	£25 0 0

SEED COMPETITIONS.

Silver Medals were awarded to :—

The Islands of Shetland.

John Walker, Maryfield, Lerwick, for Early Angus Oats.
George Bruce, Veensgarth, Lerwick, for Caithness Bere.

The District of Wester Ross.

Henry Sim, Ardullie, Evanton, for Seed Wheat.

The District of Strathearn.

John and Peter McGlashan, Easter Clevage, Dunning.

PLOUGHING COMPETITIONS.

In the course of the year 1865-66, the Society's Medal was awarded at 108 Ploughing Competitions, the details of which are given at page 440.

MEDALS IN AID OF PREMIUMS GIVEN BY LOCAL SOCIETIES.

Silver Medals were awarded to the following :—

The County of Nairn.

David Macbean of Delmany, Nairnside, Nairn, for Best Managed Farm.

The District of Spey, Avon, and Fiddochside.

Sir George Macpherson Grant, Bart., for Best Managed Farm.

The District of Mauchline.

John Miller, Stairhill, Mauchline, for Best Managed Dairy.

The County of Inverness.

James Cumming, Fingask, Bogroy, for Best Managed Green Crop.

The District of Carrick.

John Cunningham, Trees, Maybole, for Best Managed Green Crop.

The District of Leochel Cushnie.

Peter Dunn, Old Manse of Leochel, for Best Managed Green Crop.

The District of Dunblane.

John Sharp, Townhead, Dunblane, for Best Managed Green Crop.

The County of Clackmannan.

A. & A. Mitchell, Alloa, for Best Managed Carse Farm.
Walter Wyllie, Parkhead, Alloa, for Best Managed Dryfield Farm.
William Allan, Park, Clackmannan, for Best Made Hay.

The District of Fettercairn.

David Welsh, Tillytoghills, Brechin, for Best Managed Green Crop.

The County of Kincardine.

Hercules Scott of Brotherton, Johnshaven, for Best Managed Green Crop.

The District of the Cluny Association.

William Milne, Tillycairn, Cluny, for Best Managed Farm.
Henry Downie, Balvack, Monymusk, for Best Managed Green Crop.

The District of Donside.

James Rennie, Wester Fintray, Kintore, for Best Managed Green Crop.

FORRES FAT SHOW.

Richard Heath Harris, Earnhill, Forres, for Best Bullock.
Robert Bruce, Johnston, Insch, Aberdeen, for Best Heifer,
John Ferguson, East Grange, Forres, for Best Pen of Sheep.
Robert M'Kessack, of Ardgay, Forres, for Best Pig.

III.—COTTAGES AND GARDENS.

FOR THE BEST KEPT COTTAGES AND GARDENS.

First Cottage Premium, £1 5s, and Silver Medal when Four Competitors; Second, £1; Third, 15s. First Garden Premium, £1 5s., and Silver Medal when Four Competitors; Second, £1; Third, 15s.

Parish of Forgandenny.—1st Garden Premium and Medal, Thomas Duncan; 2nd, James Anderson; 3rd, Thomas M'Ewen. Medal to Alexander Nicholson, *awarded 1st Premium in* 1865.

Parish of Abernethy.—1st Garden Premium and Medal, Peter Sandilands; 2nd, John Sandilands; 3rd, John Bain

Parish of Markinch.—1st Garden Premium and Medal, William Mathew; 2nd, Alexander Mathew; 3rd, Edward Hill.

MEDALS GIVEN IN AID OF PRIVATE COMPETITIONS.

Silver Medals were awarded to the following:—

Ballindalloch.—Andrew M'Leod, for the Best Kept Cottage.

Cromar.—James Fraser, for Best Kept Cottage Garden.

Logiealmond and Glenalmond.—J. M'Leod, for Best Kept Cottage Garden.

Breadalbane, Weem, &c.—John Fraser, for Best Kept Cottage Garden.

Breadalbane, &c. (Amateurs.)—Duncan Robertson, for Best Kept Garden.

Northern District of Glasgow Society.—Peter Fox, Junr., for Best Kept Plot.

Victoria Gardens, Glasgow.—James Duncan, for Best Kept Plot.

IV.—VETERINARY COLLEGE.

Silver Medals were awarded, at the Annual Examination in April last, to the following:—

1. Joseph Kendal, Lowick Bridge, Lancashire, for Best Examination in Anatomy.
2. James P S Walker, Evanton, Rosshire, for Best Examination in Physiology.
3. A. G. Rolls, Weymouth, Dorsetshire, for Best Examination in Chemistry.
4. James P. S. Walker, Evanton, for Best Examination in Materia Medica.
5. James P. S. Walker, Evanton, for Best Examination in Cattle Pathology.
6. Edward Lewis, Great Budworth, Cheshire, for Best Examination in Horse Pathology.
7. Robert Bulman, Hexham, for Best General Examination. }
8. J. H. Hughes, Swansea, for Best General Examination. } Equal.

V.—AGRICULTURAL CLASS, EDINBURGH UNIVERSITY.

The Prizes of £6 and £4, annually allowed by the Society to the Students who pass the best and second best examinations in the Agricultural Class in the University of Edinburgh, were awarded in 1866 to

1. **Francis Moffat Haldane, Edinburgh.**
2. **David Carswell, Bathillet, Fifeshire.**

PLOUGHING COMPETITIONS *reported to the Society in* 1865-66.

Name of Society.	Place of Competition.	Date.	No. of Ploughs.	Extent.	Time.	Amount of Premiums.	First Premium and Silver Medal Awarded to
ABERDEENSHIRE—							
1. Ballater	Milltown of Tullich	11 Dec. 1865	21	⅓ acre	5 hours	£4 0 0	Patrick Glennie, Jun., Eastfield
2. Buchan (Deer District) ...	Auchtydore	19 Dec. 1865	54	¼ acre	4 hrs. 20 m.	4 10 6	John Catto, Boyengarrie
3. Buchan (Fraserburgh Dis.)	Cornhill	21 Dec. 1865	56	Rate of 1 acre	18 hours	3 18 6	James Cooper, Meikle Rathen
4. Clatt, Leslie, and Premnay	Hairstone	21 Dec. 1865	48	1 rood 14 poles	4 hours	5 1 6	William Sharp, Sunnyside
5. Coldstone and Migvie ...	Ruthven and Leys	8 Dec. 1865	85	¼ acre	5¼ hours	3 16 0	James Coutts, Ballastraid
6. Countesswells	Cadgerford	19 Dec. 1865	20	35 poles	2¾ hours	4 8 0	George Lawson, Rotten
7. Crathie	Lochnagar Ryl. Dist.	1 Feb. 1866	22	2 roods 7 poles	5¼ hours	3 5 6	Peter Coutts, Mains of Monaltrie
8. Culsalmond	Little Mns. of Newton	8 Dec. 1865	83	2-5ths	5 hours	4 8 0	George Livingstone, Upper Jericho
9. Dyce	Mains of Dyce	12 Dec. 1865	15	¼ acre	5 hours	3 0 0	Francis Lyon, Pitmedden
10. Forbes and Fordyce ...	Tyrie Mains	28 Dec. 1865	44	¼ acre	4 hours	3 10 0	John Lovie, Hillhead
11. Insch	Dunnydeer	15 Dec 1865	28	1 rood 24 poles	4 hours	3 12 0	William Kilgour, Dunnydeer
12. Leochel Cushnie	Bridgend	28 Dec. 1865	30	¼ acre	5¼ hours	4 4 0	Samuel Tawse, Brideswell
13. Newhills	Littlemill	14 Dec. 1865	30	1 rood 20 poles	5 hours	3 14 0	George Lumsden, Littlemill
14. Strichen	Strichen Home Farm	25 Jan. 1866	43	¼ acre	4 hrs. 20 min.	3 18 0	George Donald, Strichen House
ARGYLLSHIRE—							
15. Glenorchy	Brackley	30 Mar. 1866	17	¼ acre	5 hours	3 0 0	Gilbert Carmichael, Manse of Glenorchy
16. Islay, Jura, and Colonsay ...	Grobolls	23 Feb. 1866	19	¼ acre	5 hours	3 0 0	James M'Fadyen, Gruinart
17. Killean and Kilkenzie ...	High Balivain	8 Feb. 1866	20	¼ acre	5 hours	3 8 0	James Mitchell, Largiemore
18. Kilfinan	Linsaig	8 Feb. 1866	18	Rate of 1 acre	12 hours	3 10 0	Alexander Spears, Otter
19. Lorn	Seabank	7 Mar. 1866	15	1 rood 4 poles	5 hours	3 0 0	Donald Sinclair, Jun., Auchinreir
20. Poltalloch	Dunamuck	1 Feb. 1866	26	⅓ acre	5 hours	3 16 0	David Kilpatrick, Drimoore
21. Saddle and Skipness ...	Auchamenach	23 Feb. 1866	15	¼ acre	5 hours	6 0 0	A. M'Callum, Auchinasanid
AYRSHIRE—							
22. Ayr	Mount Fergusson	16 Jan. 1866	31	Rate of 1 ac. Sc.	16 hours	5 11 0	James Aird, South Corton
23. Cumnock	Knockterra	15 Jan. 1866	20	1 rood 25 poles	4 hours	4 7 6	William Smith, Thirdpart
24. Cumnock, New	Fardenreoch	3 Jan. 1866	16	Rate 1 acre Sc.	16 hours	3 11 0	George Welsh, Hall
25. Grougar	Mains	2 Apr. 1866	15	1 rood 21 poles	6 hrs. 10 m.	3 8 0	Mathew Young, Fleminghill
26. Kirkmichael	Ballsaggart	27 Jan. 1866	58	40 falls	4 hours	3 2 6	Adam Bryce, Smithston
27. Mauchline	Mosshead	23 Jan. 1866	22	Rate of 1 acre	14 hours	4 2 0	James Hodge, Friendlasshead
28. Ochiltree, Stair, &c. ...	Lochhill	11 Jan. 1866	16	¾ acre	8 hours	5 0 0	William Young, Mosshead
29. St Quivox	Laigh Thornyflat	16 Jan. 1866	18	60 falls	6¼ hours	4 7 6	William Anderson, Kirkhill
30. Sorn and Dalgain	Hillhead	31 Jan. 1866	19	40 falls	4¼ hours	3 10 0	John Morrison, Hillhead
31. Straiton	Culdoch	21 Feb. 1866	20	1¼ roods	5 hours	3 0 0	Andrew M'Garvie, Altizowne
32. Tarbolton	Fence Dyke	18 Jan. 1866	28	Rate of 1 acre	14 hours	3 18 6	Alexander Stevenson, Ladyyard
33. West Kilbride	Ardniel	Feb. 7 1866	34	Rate of 1¼ acre	16 hours	4 12 6	Thomas Dickie, Glenhead

LIST OF PLOUGHING COMPETITIONS (*continued*).

Name of Society.	Place of Competition.	Date	No. of Ploughs.	Extent.	Time.	Amount of Premiums.	First Premium and Silver Medal Awarded to
BANFFSHIRE—							
34. Marnoch	Redford	12 Dec. 1865	53	1 rood 8 poles	8 hours	£8 12 0	George Copland, Mireside
BERWICKSHIRE—							
35. Dunse	Brieryhill	14 Dec. 1865	20	¼ acre	8 hours	7 17 6	George Bell, Chalkielaw
36. Eccles	Pittlesheugh	14 Dec. 1865	24	¼ acre	7 hours	5 0 0	Alexander Dawson, Stonefield
37. Gordon...	Byrewalls	16 Dec. 1865	23	¼ acre	7½ hours	6 0 0	John Heatherhead, Huntlywood
38. Lammermuir	Ellemford	21 Dec. 1865	26	5-10 ½ acre	5½ hours	8 0 0	Alexander Gibson, Ellemford
39. Legerwood	Kirkhill	18 Dec. 1865	23	½ acre	5 hours	3 12 6	George Galbraith, Dods
BUTE AND ARRAN—							
40. Bute	Esknchraggan	6 Feb. 1866	29	Rate of 1 ac. Sc.	16 hours	7 2 6	Charles Duncan, Scoulag
41. Arran	Shedog	28 Feb. 1866	30	Rate of 1 ac. Sc	18 hours	5 7 0	William Finlay, Clauchan
CAITHNESSHIRE—							
42. Caithness	Lynegar	8 Mar. 1866	25	½ acre	6 hours	8 8 0	Hugh Munro, Lynegar
DUMBARTONSHIRE—							
43. Kirkintilloch	Wallflat	25 Jan. 1866	16	Rate of 1 acre	13½ hours	8 6 0	William Hay, Orchardton
DUMFRIESSHIRE—							
44. Kirkconnel	Rigg	5 Jan. 1866	16	1 Rood	4 hours	6 0 0	John Dalziel, Hall
45. Penpont	Croftjane	19 Jan. 1866	28	½ acre	5 hours	10 0 0	Andrew Telfar, Arkland
46. Tinwald	Tinwaldshaws	15 Dec. 1865	26	½ acre	3 hours	8 1 0	John Henderson, Barr
47. Wester Kirk	Mid Knock	16 Jan. 1866	20	⅙ acre	5 hours	4 17 0	William Gordon, Millholm
EDINBURGHSHIRE—							
48. Borthwick	Torcraik	15 Dec. 1865	34	Rate of 1 acre	10 hours	4 1 0	Philip Leadbittor, Arniston Mains
49. Calder, West	Brucefield	18 Jan. 1866	21	½ acre 2 poles	6 hours	8 15 0	James M'Morran, Langside
50. Carrington and Whitehill	Stonefieldhill	28 Dec. 1865	34	½ acre.	5 hours	4 12 6	John Bertram, Gourlaw
51. Currie	Currievale	19 Jan. 1866	43	½ acre Sc.	7 hours	4 7 0	David Somerville, Shothead
52. Glencross	Crosshouse	18 Dec. 1865	21	½ acre	6 hours	4 17 6	William M'Caul, Crosshouse
53. Lasswade	Rhodes	2 Dec. 1865	20	¼ acre	5 hours	4 16 0	Thomas Kerr, Viewbank
54. Newbattle	Langerwood	16 Dec. 1865	41	Rate of 1 acre	10 hours	6 18 0	Alexander Murray, Wester Cowden
55. Newton	Cauldcoats	5 Jan. 1866	22	½ acre Sc.	8 hours	8 11 6	John Hunter, Craigour
56. Temple	Toxside	19 Dec. 1865	36	½ acre	5 hours	3 11 6	Peter Symington, Esperston
ELGINSHIRE—							
57. Abernethy	Lurg	4 Apr. 1866	24	½ acre	6½ hours	3 5 6	William Ross, Lettoch
58. Spey, Avon and Fiddochside	Ballindalloch	8 Dec. 1865	32	½ acre	4½ hours	3 9 0	John Macpherson, Black's Boat
59. Urquhart	Newton,	4 Jan. 1866	26	¼ acre	5 hours	8 0 0	John Taylor, Tippertait

LIST OF PLOUGHING COMPETITIONS (*continued*).

Name of Society.	Place of Competition.	Date.	No. of Ploughs.	Extent.	Time.	Amount of Premiums.	First Premium and Silver Medal awarded to
FIFESHIRE—							
60. Crossgates	Easter Pitcorthie	15 Dec. 1865	35	½ acre	5 hours	£4 0 0	David Adamson, Halbeath Coy.
61. Leslie	Arnotmill	31 Jan. 1866	20	½ acre	6 hours	8 8 0	William Mitchell, Strathendry
HADDINGTONSHIRE—							
62. Dunbar, Spott, & Innerwick	Innerwick	18 Dec. 1865	24	Rate of 1 acre	10 hours	3 15 0	George Skeldon, Innerwick
INVERNESS-SHIRE—							
63. Inverness	Kingsmills	4 Jan. 1866	24	½ acre	5 hours	6 2 6	John Macdonald, Morayston
64. Strathdearn	Moy Hall	3 Apr. 1866	22	½ acre	5 hours	5 14 6	Donald Maclean, Moyhall
65. Strathspey	Balmenach	23 Mar. 1866	30	½ acre	5 hours	3 1 6	James More, Balnain
		20 Dec. 1865	49	½ acre	3½ hours	6 6 0	Alexander Machardy, Bankhead
KINCARDINESHIRE—							
66. Durris	Cairnfauld	20 Dec. 1865	22	Rate of ½ acre	6½ hours	5 18 0	Andrew Milne, Newhall
67. Elsick	Quoiles	21 Dec. 1865	34	½ acre	5 hours	8 2 6	George Burnet, Kirkhill
68. Nigg	Altens	26 Dec. 1865	35	Rate of ½ acre	5 hours	6 0 0	Henry Stewart, Mains of Badentoy
69. Portlethen	Mains of Hillside	8 Dec. 1865	34	Rate of 1 acre	10 hours	11 6 6	Hugh Strachan, Cowton
70. Rickarton and Ury. ...	Redcloak						
KIRKCUDBRIGHT—							
71. Glenkens	Damcroft	20 Feb. 1866	26	1 rood 20 poles	4 hours	4 7 6	Andrew Carter, Shiel
72. New Abbey	Ingleston	5 Jan. 1866	23	½ acre	5 hours	6 5 0	James Robson, Lochhill
73. Penningham, Minnygaff, &c	Machermore Mains	5 Jan. 1866	36	½ acre	5½ hours	7 12 6	William Agnew, Mulloch
74. Rerrick	Culnaughtrey	28 Dec. 1865	33	Rate of 1 acre	11 hours	4 7 6	David Reid, Auchengool
LANARKSHIRE—							
75. Culter	Upper Hangingshaw	5 Jan. 1866	22	½ acre Sc.	6 hours	6 2 6	Robert Gilroy, Bamflatt
76. East Kilbride...	Long Calderwood	30 Jan. 1866	29	½ acre Sc.	8 hours	7 12 6	Thomas Cochran, Clochearn
77. New Monkland	Rocksolloch	18 Jan. 1866	16	8 acres	8½ hours	8 10 0	Alexander Miller, Annathill
78. Old Monkland	Glenduffhill	26 Jan. 1866	35	Rate of 1 acre	15 hours	10 2 6	Archibald Mitchell, Balmuildy
79. Weston and Roberton ...	Hardington Mains	6 Feb. 1866	17	½ acre	6 hours	4 5 0	John Forrest, Eastfield
NAIRNSHIRE—							
80. Nairnshire	Lochdhu	20 Jan. 1866	77	½ acre	5 hours	4 15 6	William Macdonald, Castle Heather
ORKNEY—							
81. West Mainland	Kierfiold	24 Jan. 1866	21	1 rood 30 poles	5 hours	4 7 0	James Stanger, Skaill
PEEBLESSHIRE—							
82. Biggar and Skirling	Skirling Mains	22 Dec. 1865	41	½ acre	8 hours	7 6 6	John Black, Langlees
83. Manor	Barns	5 Jan. 1866	18	2 roods 16 poles	6 hours	4 10 0	George Wilkison, Woodhouse
84. Peebles Parish	Nether Kidstone	15 Dec. 1865	28	½ acre	7 hours	4 4 0	John Fraser, Nether Kidstone
85. West Linton	South Slipperfield	29 Dec. 1865	18	½ acre	7 hours	3 0 0	James Givin, Rutherford

LIST OF PLOUGHING COMPETITIONS (*continued*).

Name of Society.	Place of Competition.	Date.	No. of Ploughs.	Extent.	Time.	Amount of Premiums.	First Premium and Silver Medal Awarded to
PERTHSHIRE—							
86. Auchterarder... ... [&c	Kirkton	18 Jan. 1866	19	½ acre	5 hours	£8 8 0	David Donaldson, Arns
87. Blairdrummond, Ochtertyre,	Brierlands	28 Dec. 1865	19	1 rood 35 poles	5¾ hours	8 15 0	William Johnman, Nyad
88. Comrie & Upper Strathearn	Cowden	17 Mar. 1866	19	½ acre	6 hours	8 13 6	George Ferguson, Meggar
89. Drummond Castle	Crosshead	19 Jan. 1866	20	1 rood 17 poles	5 hrs. 20 m.	4 17 0	Thomas Millar, Bulloch
90. Glenalmond	Glenalmond	8 Feb. 1866	21	1 rood 28 poles	5 hours	4 18 0	Daniel Miller, Feudoch
91. Glengarry and Glenerrochy	Invervack	28 Mar. 1866	15	½ acre	6 hours	6 8 0	Thomas Mackenzie, Kindrochet
92. Madderty	Welltree	8 Feb. 1866	19	1 rood 38 poles	5 hrs. 15 m.	5 0 0	William Ramsay, Parkside
93. Monzievaird and Strowan	Laggan	14 Mar. 1866	20	½ acre	7 hours	5 5 0	Peter Cameron, Monzievaird
94. Moulin	Moulinarn	22 Mar. 1866	20	½ acre	4½ hours	8 18 6	Alexander Campbell, Pitlochry
95. St Martins	St Martins	1 Feb. 1866	23	½ acre	5 hours	4 8 0	William Paterson, Damside
96. Strathearn Central	Innerdunning	23 Jan. 1866	18	¼ acre	3 hours	8 0 0	John Todd, Belhie
97. Weem	Castle Menzies	10 Mar. 1866	33	1 rood 10 poles	8 hours	7 7 6	Duncan Menzies, Dalrawer
RENFREWSHIRE—							
98. Erskine	Dargavel	9 Jan. 1866	15	Rate of 1 acre	15 hours	8 11 0	James Salmond, Gladstone
99. Renfrewshire	Dargavel	19 Jan. 1866	30	Rate of 1 acre	14½ hours	7 10 6	Thomas Lochead, Hatton
ROSS AND CROMARTY—							
100. Lews	Manor Farm	20 Feb. 1866	16	½ acre	7 hours	8 2 6	George Watt, Mossend
ROXBURGHSHIRE—							
101. Lilliesleaf	Bewlie Hill	6 Dec. 1865	28	½ acre	6 hrs. 40 m.	9 2 6	Andrew Pender, Tandlaw
102. Melrose	Newtown St Boswells	16 Dec. 1865	37	½ acre	7 hours	5 12 6	Adam Brymer, Nottylees
103. West Teviotdale	Horsleyhill	30 Dec. 1865	33	½ acre	5 hours	7 10 0	Andrew Pender, Tandlaw
STIRLINGSHIRE.							
104. Muiravonside	Glenhead	7 Feb. 1866	20	½ acre	7 hours	8 17 6	Robert Meikle, Candie
WIGTOWNSHIRE.							
105. Kirkmaiden	Crruchan	30 Dec. 1865	58	½ acre	5 hours	8 2 6	James M'Lean, Low Drumore
106. Machars	Borland	26 Dec. 1865	29	4-10 acre	4 hours	4 10 0	James Stewart, Whitehills
107. Old Luce	Longforth	24 Jan. 1866	34	1 rood 25 poles	4 hours	4 12 0	William Angus, Balmesh
108. Stoneykirk	Balgreggan	28 Dec. 1865	47	½ acre	5 hours	7 0 0	John Wilson, Freugh

PREMIUMS OFFERED BY THE SOCIETY

IN

1867.

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GENERAL NOTICE.

THE HIGHLAND SOCIETY was instituted in the year 1784, and established by Royal Charter in 1787. Its operation was at first limited to matters connected with the improvement of the Highlands of Scotland; but the supervision of certain departments, proper to that part of the country, having been subsequently committed to special Boards of Management, several of the earlier objects contemplated by the Society were abandoned, while the progress of agriculture led to the adoption of others of a more general character. The exertions of the Society were thus early extended to the whole of Scotland, and have, for the greater part of a century, been directed to the promotion of the science and practice of agriculture in all its branches.

In accordance with this more enlarged sphere of action, the original title of the Society was altered, under a Royal Charter, in 1834, to THE HIGHLAND AND AGRICULTURAL SOCIETY OF SCOTLAND.

The leading purposes of the Institution are set forth in the following pages, where it will be found that Premiums are awarded for Reports on almost every subject connected with the cultivation of the soil; the rearing and feeding of stock; the management of the dairy; the improvement of agricultural machinery and implements; the growth of timber; the extension of cottage accommodation; the application of chemical science; and the dissemination of veterinary information.

Among the more important measures which have been effected by the Society are—

1. Agricultural Meetings and General Shows of Stock, Implements, &c., held in the principal Towns of Scotland, at which Exhibitors from all parts of the United Kingdom are allowed to compete.

2. A system of District Shows instituted for the purposes of improving the breeds of Stock most suitable for different parts of the country, and of aiding and directing the efforts of Local Agricultural Associations.

3. The promotion of Agricultural Education, under powers conferred by a supplementary Royal Charter granted in 1856, and authorising "The COUNCIL of the HIGHLAND AND AGRICULTURAL SOCIETY on EDUCATION" to grant Diplomas to Students of Agriculture (see p. 502).

4. The advancement of the Veterinary Art, by conferring Diplomas on Students who have passed through a prescribed curriculum, and who are found, by public examination, qualified to practise.

5. The appointment of a Chemist, for the purpose of promoting the application of science to agriculture. Investigations on subjects of importance are conducted in the Laboratory, and published in the Transactions. Members can obtain analyses, reports, and advice, on terms below those charged to others (see pp. 505-506).

6. The periodical publication of the Transactions, which comprehend the proceedings in the Laboratory, reports of experiments, and other communications invited and approved by the Society.

CONSTITUTION AND MANAGEMENT.

The general business of THE HIGHLAND AND AGRICULTURAL SOCIETY is conducted under the sanction and control of a Royal Charter, which authorises the enactment of Bye-Laws. Business connected with Agricultural Education is conducted under the authority of a Supplementary Royal Charter, also authorising the enactment of Bye-Laws.

The Office-Bearers consist of a President, Four Vice-Presipents, Ten Extraordinary, and Thirty Ordinary Directors, a Treasurer, an Honorary and an Acting Secretary, an Auditor, and other Officers. The proceedings of the Directors are reported to General Meetings of the Society, held in January, and in June or July. The Council on Education, under the Supplementary Charter, consists of Sixteen Members—Nine nominated by the Charter, and Seven elected by the Society. The Board of Examiners consists of Eleven Members.

Members are elected at the half-yearly General Meetings. The ordinary subscription is £1 3s. 6d. annually, which may be redeemed by one payment, varying, according to the number of previous annual payments, from £12 12s. to £7 1s. Tenant-Farmers, Secretaries, and Treasurers of local Agricultural Associations, resident Agricultural Factors, and Proprietors farming the whole of their own lands, whose valuation does not exceed £500, are admitted on a subscription of 10s. annually, or £5 5s. for life.

Members of the Society receive the Transactions on application, and are entitled to apply for District Premiums—to report Ploughing Matches for the Medal—to attend Shows free of charge, and to exhibit Stock and consult the Chemist at reduced rates.

Orders payable at the Royal Bank of Scotland, are issued by the Directors, in name of the parties in whose favour Premiums have been awarded.

All communications must be addressed to "FLETCHER NORTON MENZIES, Esq., Secretary of the Highland and Agricultural Society of Scotland, No. 3, GEORGE IV. BRIDGE, EDINBURGH."

ESTABLISHMENT FOR 1867.

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HIS GRACE THE DUKE OF BUCCLEUCH AND QUEENSBERRY, K.G.

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Thomas Anderson, M.D., Professor of Chemistry in the University of Glasgow, *Chemist*.
Kenneth Mackenzie, C.A., *Auditor*.
W. J. Macquorn Rankine, LL.D., Professor of Civil Engineering in the University of Glasgow, *Consulting Engineer*.
Alexander Slight, *Practical Engineer*.
Gourlay Steell, R.S.A., *Animal Portrait Painter*.
J. H. B. Hallen, *Professor of Veterinary Surgery*.
Thomas Duncan, *Clerk*.
Arthur King & Co., Aberdeen, *Publishers of Transactions*.
Neill & Company, *Printers*.
Mackay, Cunningham, & Co., *Silversmiths*.
Alexander Kirkwood & Son, *Medallists*.
John Watherston & Sons, *Inspectors of Works*.
William M'Neill, *Messenger*.

Chairmen of Standing Committees.

Argyll Naval Fund,	Admiral Sir Wm. J. Hope Johnstone, K.C.B.
Chemistry, . .	Professor Anderson.
Cottages, . . .	Harry Maxwell Inglis of Logan Bank.
District Shows, . .	A. Campbell Swinton, yr. of Kimmerghame.
Finance, . . .	Anthony Murray of Dollerie.
General Shows, . .	Alex. Kinloch, yr. of Gilmerton.
House and Buildings,	John Ord Mackenzie of Dolphinton.
Machinery, . .	John Gibson, Woolmet.
Premiums for Reports on the Science and Practice of Agriculture,	Professor Lyon Playfair, C.B.
Premiums for Reports on Woods and Plantations,	Professor Balfour.
Publications, . .	Alexander Forbes Irvine of Drum.
Veterinary College Examinations,	* * * * * *

All communications should be addressed to Fletcher Norton Menzies, Esq., Secretary of the Highland and Agricultural Society of Scotland, No. 3, George IV. Bridge, Edinburgh.

Council on Education.

By a Supplementary Charter under the Great Seal, granted in 1856, the Society is empowered to prescribe a Curriculum for Agricultural Education, and to grant Diplomas.

Members of Council named by Charter.

The President of the Highland and Agricultural Society—*President.*
The Lord Justice-General—*Vice-President.*

The Lord-Advocate.
The Dean of Faculty.
The Professor of Agriculture.
The Professor of Anatomy.
The Professor of Botany.
The Professor of Chemistry.
The Professor of Natural History.

Members of Council named by Society.

Sir George Clerk, Bart.
Sir W. Gibson-Craig, Bart.
Sir A. C. R. Gibson-Maitland, Bart.
George Hope, Fenton Barns.
Robert Russell, Pilmuir.
Henry Stephens, Redbrae.
John Wilson, Edington Mains.

Board of Examiners.

Science and Practice of Agriculture—Mechanics and Construction—Professor Wilson; George Hope, Fenton Barns; Robert Russell, Pilmuir; and John Wilson, Edington Mains.
Botany—Professor Balfour.
Chemistry—Professor Anderson.
Natural History—Professor Allman.
Veterinary Surgery—Professor Hallen.
Field Engineering and Surveying—Professor Macquorn Rankine, and David Stevenson, C.E.
Book-Keeping and Accounts—Kenneth Mackenzie, C.A., and Archibald Patterson, Meadowfield.

Chambers.

No. 3, GEORGE IV. BRIDGE, EDINBURGH.

PREMIUMS.

GENERAL REGULATIONS FOR COMPETITORS.

All Reports must be legibly written, and on one side of the paper only; they must specify the number and subject of the Premium for which they are in competition; they must bear a distinguishing motto, and be accompanied by a sealed letter similarly marked, containing the name and address of the Reporter; initials must not be used.

No sealed letter, unless belonging to a report found entitled to one-half of the Premium offered, will be opened without the author's consent.

Reports, for which a Premium, or one-half of it, has been awarded, become the property of the Society, and cannot be published, in whole or in part, nor circulated in any manner, without the consent of the Directors. All other papers will be returned to the authors, if applied for within twelve months.

When a Report is unsatisfactory, the Society is not bound to award the whole or any part of a premium.

All Reports must be of a practical character, containing the results of the writer's own observation or experiment, and the special conditions attached to each premium must be strictly fulfilled. General essays, and papers compiled from books, will not be rewarded. Weights and measurements must be indicated by the imperial standards.

The decisions of the Board of Directors are final and conclusive as to all premiums, whether for Reports or at General or District Shows, and it shall not be competent to raise any question or appeal touching such decisions before any other tribunal.

Reports on subjects not included in the premium list will be received, and honorary rewards will be given when merited.

CLASS I.

REPORTS.

CTION 1.—ON SUBJECTS CONNECTED WITH THE SCIENCE AND PRACTICE OF AGRICULTURE.

1. AGRICULTURE OF ABERDEENSHIRE AND BANFFSHIRE.

For an approved Report on the Agriculture of Aberdeenshire and Banffshire—Thirty Sovereigns.

The Report should embrace full details of the different systems of Farm Management observed in the district, and of the progress which Agriculture has made within the last 25 years.

Reports to be lodged by 1st November, 1867.

2. AGRICULTURE OF DUMFRIESSHIRE.

For an approved Report on the Agriculture of Dumfriesshire—Thirty Sovereigns.

The Report should embrace full details of the different systems of Farm Management observed in the district, and of the progress which Agriculture has made within the last 25 years.

Reports to be lodged by 1st November, 1867.

3. MANURES PRODUCED BY DIFFERENT KINDS OF FEEDING.

For an approved Report of the result of experiments for ascertaining the comparative value of farm-yard Manure, obtained from cattle fed upon different varieties of food, by the application of such manures to farm crops—Twenty Sovereigns.

The Report must state the effects produced on two successive crops by the application of manure obtained from cattle fed on different sorts of food, such as turnips and straw alone; and turnips and straw, with an addition of oil-cake, linseed, bean-meal, grain, or other substances. The animals should be as nearly as possible of the same age, weight, condition, and maturity, and each lot should receive daily the same quantity of litter; and, except as to the difference of food, they must be treated alike.

The preparation of the manure, by fermentation or otherwise, should be in every respect the same; and it is desirable that not less than two several experiments be made with each kind, and that the ground to which it is to be applied be as equal as possible in quality and condition.

Reports to be lodged by 1st May in any year.

4. MANURE MADE WITH AND WITHOUT COVER.

For an approved Report on the comparative value of Manure made in the ordinary manner, and of Manure kept under cover till applied to the land—Twenty Sovereigns.

The experiment may be conducted either with manure made in the open strawyard, contrasted with that made in covered hammels or boxes, or with manure made in feeding-houses, part of which shall have been placed under cover, and part removed to the open dung-pit, and kept carefully unmixed with any other manure. Preference will be given to experiments embracing both of these modes. The cattle must be fed and littered alike. There must be at least an acre of land experimented on with each sort of manure—the different lots must be manured to the same extent, and be equal in soil and the crops must be accurately weighed and measured on two separate portions of each lot, not less than 20 poles. The result, as given by two successive crops, to be reported.

Reports to be lodged by 1st May in any year.

5. AUTUMN MANURING.

For an approved Report on the comparative advantages of applying Manure to the stubble in autumn, or in the drills in spring, for turnips, potatoes, or beans—Twenty Sovereigns.

The experiment must extend over two years, and comprise a green crop and a grain crop. It must be conducted on not less than four acres—one-half of which shall be dunged in autumn, and the other in spring, with manure made as nearly as possible in the same way, and of equal quantity and quality. The treatment and condition of the land prior to the experiment must be mentioned.

As the object of this premium is to determine the comparative advantages of autumn manuring, there will be no restriction as to labouring the land, but the reporter must state how that was done on each lot during the experiment, which, if possible, should be repeated in duplicate.

Reports to be lodged by 1st May, 1868.

6. IMPROVED VARIETIES OF AGRICULTURAL PLANTS.

For an approved Report on the means successfully employed for obtaining new and superior varieties, or improved subvarieties, of any of the cereal grains, grasses, roots, or other agricultural plants—The Gold Medal, or Ten Sovereigns.

It is necessary that the varieties and sub-varieties reported upon shall have been proved capable of reproduction from seed, and also that the relation they bear to others, or well-known sorts, should be stated. The reporter is further requested to mention the effects that he may have observed produced by different soils, manures, &c., on the plants forming the subjects of reports, and how far he may have ascertained such effects to be lasting.

Should any improved variety reported upon be the result of direct experiment by cross impregnation, involving expense and long-continued attention, a higher premium will be awarded.

Reports to be lodged by 1st November, 1867.

7. COMPARATIVE PRODUCTIVENESS, &c., OF POTATOES.

For an approved Report on the comparative productiveness and general qualities for use and keeping, of different kinds of Potatoes used in field culture—The Gold Medal, or Ten Sovereigns.

Reports to be lodged by 1st November, 1867.

8. COMPARATIVE PRODUCTIVENESS, &C., OF TURNIPS.

For an approved Report of the comparative productiveness and general qualities for use and keeping of the different kinds of Swedish, Yellow, and White Turnips, generally used in field culture—The Gold Medal, or Ten Sovereigns.

Reports to be lodged by 1st May, 1868.

9. CULTIVATION OF CABBAGE.

For an approved Report on the cultivation of the Cabbage as a field crop—The Gold Medal, or Ten Sovereigns.

The experiment must be conducted on not less than one acre, and contrasted with a like extent under turnips in the same field. Both lots must have been under one rotation, and must be prepared and manured in the same manner.

Reports to be lodged by 1st May, 1868.

10. VEGETABLE PRODUCTIONS OF INDIA, CHINA, AMERICA, &C.

For an approved Report on the hardy and useful herbaceous plants, including Grains and Grasses of China, Japan, the Islands of the Eastern Archipelago, the Himalaya country, the Falkland and South Sea Islands, California, the high north-western districts of America, or any other country where such climate exists as to induce the belief that the plants may be beneficially introduced into the cultivation of Scotland—The Gold Medal, or Ten Sovereigns.

Reporters are required to give the generic and specific names of the plants treated of, with the authority for the same—together with the native names, in so far as known; and to state the elevation of the locality and nature of the soil in which they are cultivated, or which they naturally inhabit, with their qualities or uses; and it is further requested that the descriptions be accompanied, in so far as possible, with specimens of the plants, and their fruit, seed, or other products.

Reports to be lodged by 1st November in any year.

FEEDING STOCK.

The experiments specified in Nos. 11 and 12 must be conducted over a period of not less than three months. No lot shall consist of fewer than four Cattle or ten Sheep. The animals selected should be of the same age, sex, and breed, and, as nearly as possible, of the same weight, condition, and maturity. The live weight before and after the experiment must be stated, and, if killed, their dead weight and quantity of tallow.

11. BEST MODES OF HOUSING FATTENING CATTLE.

For an approved Report on the comparative advantages of fattening Cattle in stalls, in loose houses or boxes, and in sheds or hammels—Twenty Sovereigns.

The Report must detail the comparative result of actual experiments. The same quantities and kinds of food shall be used. Information is required as to the comparative expense of attendance, the cost of erecting the buildings, and any other circumstances deserving of attention. The state of the weather during the experiment, in point of temperature and wetness, must be particularly noted and reported.

Reports to be lodged by 1st May in any year.

12. DIFFERENT DESCRIPTIONS OF FOOD.

For an approved Report of experiments for ascertaining the actual addition of weight to growing or fattening stock, by the use of different kinds of food—Twenty Sovereigns.

The attention of the experimenter is directed to turnips, carrots, beet, mangold-wurzel, potatoes, cabbage, as well as to beans, oats, barley, Indian corn, linseed, oil-cake, or rape-cake, and to the effect of warmth and proper ventilation, and the difference between food cooked and raw. The above roots and other kinds of food are merely suggested; competitors are neither restricted to them, nor obliged to experiment on all of them.

When experiments are made with linseed and cake, attention should be paid to the comparative advantages, economically and otherwise, of the substances in these two states.

Before commencing the comparative experiments, the animals must be fed alike for some time previously.

The progress of different breeds may be compared: this will form an interesting experiment of itself, for reports of which encouragement will be given.

Reports to be lodged by 1st May in any year.

13. SANITARY ARRANGEMENTS FOR STOCK.

For an approved Report on the best construction and arrangement of Byres, Sheds, and Courts for Cattle, with a view to sanitary requirements—The Gold Medal, or Ten Sovereigns.

The Report must have reference to all descriptions of stock, whether breeding, feeding, dairy, or young cattle.

Reports to be lodged by 1st November, 1867.

14. TRANSIT OF STOCK.

For an approved Report on the conditions which should regulate the Carriage of Stock by railway, or by sea, as well as its transit by road—Twenty Sovereigns.

The Reporter will refer to the various modes by which stock is usually forwarded; to the disadvantages attaching thereto, and the evils resulting therefrom; and to the manner in which these should be obviated.

Reports to be lodged by 1st November, 1867.

15. DIPPING AND SMEARING SHEEP.

For an approved Report on the processes of Dipping, Pouring, and Smearing Sheep, and the materials employed for the purpose—Twenty Sovereigns.

> **The Reporter must discuss the relative advantages of Dipping, Pouring, and Smearing, the use of summer dips, the nature and qualities of the different materials which have been used, and their effect on the wool and on the health of the Sheep. The facts detailed must be derived from the practical experience of the Reporter.**
>
> **Reports to be lodged by 1st November, 1869.**

16. RURAL ECONOMY ABROAD.

For an approved Report, founded on personal observation, of any useful practice, in rural economy, adopted in other countries, and susceptible of being introduced with advantage into Scotland—The Gold Medal.

> **The purpose chiefly contemplated by the offer of this premium is to induce travellers to notice and record such particular practices as may seem calculated to benefit Scotland.**
>
> **Reports to be lodged by 1st November in any year.**

SECTION 2.—LAND IMPROVEMENTS.

1. GENERAL IMPROVEMENT OF ESTATES.

To the Proprietor who shall report the most judicious, successful and extensive improvement—the Gold Medal, or Ten Sovereigns.

> **The merits of the Report will not be determined so much by the mere extent of the improvements, as by their character and relation to the size of the property. The improvements may comprise reclaiming, draining, enclosing, planting, road-making, building, and all other operations proper to landed estates. The period within which the operations may have been conducted is not limited, except that it must not exceed the term of the reporter's proprietorship.**
>
> **Reports to be lodged by 1st May in any year.**

2. RECLAMATION OF WASTE LAND BY TILLAGE.

1. For an approved Report by a Proprietor or Tenant of having reclaimed within the six preceding years not less than fifty acres of waste land—The Gold Medal, or Ten Sovereigns.

2. For an approved Report by a Tenant of having reclaimed within the four preceding years not less than twenty acres of waste land—The Medium Gold Medal, or Five Sovereigns.

3. For a similar Report by a Tenant of having reclaimed less than ten acres—The Silver Medal.

The Reports may comprehend such general observations on the improvement of waste lands as the writer's experience may lead him to make, but must refer especially to the lands reclaimed —to the nature of the soil—the previous state and probable value of the subject—the obstacles opposed to its improvement—the details of the various operations—the mode of cultivation adopted—and the produce and value of the crops produced. As the required extent cannot be made up of different patches of land, the improvement must have relation to one subject; it must be of a profitable character, and a rotation of crops must have been concluded before the date of the report. *A detailed statement of the expenditure and return*, and a certified measurement of the ground, are requisite.

Reports to be lodged by 1st May in any year.

3. IMPROVEMENT OF NATURAL PASTURE WITHOUT TILLAGE.

1. For an approved Report of an improvement of the pasturage of not less than thirty acres, by means of top-dressing, draining, or otherwise without tillage, in situations where tillage may be inexpedient—The Gold Medal, or Ten Sovereigns.

2. For an approved Report of a similar improvement of not less than ten acres—The Silver Medal.

Reports must state the particular mode of management adopted, the substances applied, the elevation and nature of the soil, its previous natural products, and the changes produced.

Reports to be lodged by 1st May in any year.

SECTION 3.—AGRICULTURAL MACHINERY.

INVENTION OR IMPROVEMENT OF IMPLEMENTS OF HUSBANDRY.

For approved Reports of such inventions or improvements, by the Reporters, of any agricultural implement or machine as shall be deemed by the Society of public utility—Medals, or sums of money not exceeding Fifty Sovereigns.

Reports may be lodged with the Secretary at any time, and should be accompanied by drawings and descriptions of the implement or machine, and, if necessary, by a model.

SECTION 4.—WOODS AND PLANTATIONS.

1. EXTENSIVE PLANTING.

For an approved Report by a Proprietor who shall, within the five preceding years, have planted not less than 150 acres. The hole planting operations that may have been conducted by the orter within the five years, whether completed or not, must braced, and he must state the expense—description of soil kind, and number of trees planted per acre—mode of planting, draining, and fencing—general state of the plantation —and any other observations of interest—The Gold Medal.

Reports to be lodged by 1st November in any year.

2. FORMATION AND MANAGEMENT OF YOUNG PLANTATIONS.

For an approved Report of Plantations formed within a period of not more than ten, nor less than five years preceding the date of the Report—The Gold Medal, or Ten Sovereigns.

The Report should comprehend every interesting particular; among others, the exposure, altitude, and general climate of the locality —the character and condition of the soil and subsoil—a detailed statement of the expense, including that of enclosing, draining, and fencing, and a specification of the manner in which these operations were performed—the mode of planting adopted—the prevailing weather while planting, and for a month after the operation—the kind of trees planted, and the number of each kind per acre—their relative progress—the proportion of blanks and deaths at the end of three years—the system of management—the state of the plantations at the date of making the report—and any other observations of interest.

Reports to be lodged by 1st November in any year.

3. GENERAL MANAGEMENT OF PLANTATIONS.

For an approved Report of the management of Plantations, from the commencement of the first thinning till the period of yielding full-grown timber—The Gold Medal, or Ten Sovereigns.

The Report must embrace the following points:—The progress of the different sort of trees—the effects of altitude and exposure —the general advantages of shelter—the mode of thinning and pruning adopted—the uses and value of the thinnings—the plan of registry and of valuing, or a specimen of the method in which the forester's book is kept—the valuation at the time of the report—together with such general remarks as may be thought useful.

The Report is not expected to embrace the formation and early management, farther than the description of soil, kinds of plants, whether mixed or in masses, together with a note of the expense from the time of planting to the commencement of the first thinning, in so far as such information is in the possession of the Reporter.

Reports to be lodged by 1st November in any year.

4. PLANTING ON EXPOSED OR ON BARREN TRACTS.

For an approved Report on successful planting within the influence of the sea, or on exposed sterile tracts, founded on observation of the habits and appearance of the different sort of trees considered best suited for such situations—The Gold Medal, or Ten Sovereigns.

The plantations reported on must not be less than ten years old.

Information is particularly desired regarding the species and varieties of trees calculated for growing in situations unfavour

able to most of those generally cultivated, as bleak heaths, sandy links, unsheltered maritime situations, and high northern exposures.

The Reporter must specify the extent of planting and mode of drainage and fencing—the nature of the soil and subsoil—the elevation and exposure of the locality—its distance from the sea; and, if in his power, he should notice the geological features of the district.

Reports to be lodged by 1st November in any year.

5. CORSICAN FIR.

For an approved Report on the value, for economical purposes, of the Corsican Fir, and on its adaptation to different soils and situations—The Medium Gold Medal, or Five Sovereigns.

The Reporter's observations must go beyond the limited knowledge of this tree as hitherto grown in Britain, and must embrace its nature, uses, and adaptations in those countries of which it is a native.

Reports to be lodged by 1st November in any year.

6. AMERICAN AND CANADIAN TREES.

For an approved Report on the American and Canadian forest trees adapted for cultivation in Great Britain—The Medium Gold Medal, or Five Sovereigns.

The Reporter will enumerate and describe the varieties which have been, or which may be, usefully introduced from North America—the soils, situations, and conditions most suitable for them—their economic uses and qualities, and the success which may have attended the cultivation of any of them in Great Britain.

Reports to be lodged by 1st November, 1867.

7. FOREST TREES OF RECENT INTRODUCTION.

For an approved Report on the more extended introduction of hardy, useful, or ornamental trees, which have not hitherto been generally cultivated in Scotland—The Medium Gold Medal, or Five Sovereigns.

The report should specify as distinctly as possible the kind of trees introduced. The adaptation of the trees for use or ornament, and their comparative progress, should be mentioned. Attention is directed to the introduction of any tree as a nurse in young plantations, which by growing rapidly for several years, and attaining maturity when at the height of 20 or 25 feet, might realise the advantages and avoid the evils of thick planting.

Reports to be lodged by 1st November in any year.

8. ROOTS OF CONIFERÆ.

For an approved Report of experiments on the uses to which the fibrous parts of the roots of Coniferous trees may be applied—The Medium Gold Medal, or Five Sovereigns.

In North-west America, the fibrous parts of the roots of some Coniferous trees are extensively employed for purposes similar to those to which willows are applied in this country, more particularly when the wood has been grown on soft, peaty soils. The object of the premium is to elicit information regarding the possibility of profitably extracting and economically applying the vast quantities of roots left in the ground.

Reports to be lodged by 1st November in any year.

9. LARCH FORESTS.

For an approved Report on the formation, progress, present condition, and prospects of extensive Larch Forests in Scotland, with special reference to the best mode of preventing or curing disease—Twenty Sovereigns.

Reports to be lodged by 1st November, 1867.

10. TREES NOT LIABLE TO BE DESTROYED BY RABBITS.

For an approved Report on Trees, the bark of which is found least liable to be destroyed by Rabbits—The Gold Medal, or Ten Sovereigns.

Information is particularly requested in regard to Conifers in this respect.

Reports to be lodged by 1st November, 1867.

CLASS II.

DISTRICT COMPETITIONS.

The Money Premiums awarded at District Competitions will be paid after 1st January next, by precepts issued by the Directors. No payments must therefore be made by the Secretary or Treasurer of any local Association.

(*Grants in aid of* DISTRICT COMPETITIONS *for* 1868 *must be applied for before* 1st NOVEMBER *next*.)

SECTION 1.—CATTLE.

1. *The Islands of Shetland.*
2. *The District of Annandale.*
3. *The Island of Skye.*
4. *The County of Elgin.*
5. *The County of Nairn.*
6. *The County of Banff and District of Turriff.*
7. *The County of Kincardine.*
8. *The District of Formartine.*
9. *The District of Perth, Fife, Kinross, and Clackmannan.*
10. *The District of Strontian.*
11. *The District of Kintyre.*

Conveners of Committees.

FIRST DISTRICT—John Bruce of Sumburgh.
SECOND DISTRICT—Sir William Jardine, Bart.
THIRD DISTRICT—Alexander K. Mackinnon of Corry.
FOURTH DISTRICT—C. L. Cumming Bruce, M.P.
FIFTH DISTRICT—W. A. Stables, Cawdor Castle.
SIXTH DISTRICT—Alexander Morison of Bognie.
SEVENTH DISTRICT—Sir Thomas Gladstone, Bart.
EIGHTH DISTRICT—John Ramsay of Barra.
NINTH DISTRICT—Sir Wm. Stirling Maxwell, Bart., M.P.
TENTH DISTRICT—Sir Thomas Miles Riddell, Bart.
ELEVENTH DISTRICT—John Lorn Stewart of Coll.

PREMIUMS.

1. For the best Bull, of any pure breed, not exceeding eight years old, belonging to a Proprietor—The Silver Medal.	
2. For the best Bull, of any pure breed, calved before 1st January, 1865, and not exceeding eight years old,	£7
3. For the second best, ...	£4
4. For the best Bull, of any pure breed, calved after 1st January, 1865, ...	£6
5. For the best two-year-old Heifer (if Highland breed, three years), of any pure breed, . . .	£5
6. For the second best, ...	£3

Proprietors farming the whole of their own lands may compete for the Money Premiums.

Note.—The Society's Premiums are granted to each district for three alternate years, on condition that the district shall, in the two intermediate years, continue the Competitions by offering for the same description of stock a sum not less than one-half of that given by the Society.

At the intermediate Competitions, a Silver Medal will be placed at the disposal of the Committee, to be awarded to the best lot exhibited.

In 1867,

Nos. 1, 2, 3, 4, 5, and 6 are in competition for the second year.
No. 7 for the first year.
Nos. 8 and 9 compete for local premiums.
Nos. 10 and 11 are in abeyance on account of the Glasgow Show.

RULES OF COMPETITION.

1. The Members of the Society connected with the respective Districts are appointed Committees for arranging the Competitions; five members to be a quorum.

2. The Convener of each district shall summon a meeting of Committee for the purpose of determining the time and place of Competition, the nomination of Judges, and other preliminary arrangements. The time and place (which must be within the bounds of the district) shall be publicly intimated by Conveners.

3. The Competitions must take place between the 1st of April and the 20th of October, and are open to all parties within the district, whether members of the local Association or not. The animals exhibited must belong to one of the following pure breeds:—Shorthorn, Ayrshire, Polled (Galloway, Angus, or Aberdeen), Highland. The Bulls may be of one breed, and the Heifers of another. The Committee shall select the breed, and specify it in the returns.

4. Stock of an inferior description, or which does not fall within the prescribed regulations, shall not be placed for competition. The Premiums shall not be divided. *No Money Premium shall be adjudged unless*

there are three lots exhibited, and not more than one-half unless there are six. A competitor may exhibit two lots in each class. For the Medal, two lots are required.

5. An animal which has gained the Society's first Premium at a previous District or General Show is inadmissible in the same class, except for the Medal; and one which has gained a second Money Premium can only thereafter compete in that class for the first.

6. A Tenant or Factor may compete with Proprietors for the Medal with a Bull which has gained the first Money Premium at a previous Show. When there is any doubt as to whether a competitor should be ranked as a Proprietor or a Tenant, the point is left to the decision of the local Committee.

7. A Bull, the property of two or more Tenants, may compete, although the Exhibitors may not be joint-tenants

8. Stock must be the property of the Exhibitor at the date of entry, *and no entry shall be received later than one week previous to the Show.* Entry-money shall not exceed 2½ per cent. on the amount of the Premium to be competed for.

9. Bulls for which the Money Premiums are awarded may be required to serve in the district at least one season; the rate of service to be fixed by the Committee.

10. Should it be proved to the satisfaction of the Committee that an animal has been entered under a false name, pedigree, or description, for the purpose of misleading the Committee or Judges as to its qualifications or properties, the case shall be reported to the Directors, and submitted by them to the first General Meeting, in order that the Exhibitor shall be disqualified from again competing at the Society's Shows, and his name, if he be a member, struck from the roll.

11. When an animal has previously been disqualified by the decision of any Agricultural Association in Great Britain or Ireland, such disqualification shall attach, if the Exhibitor, being aware of the disqualification, fail to state it, and the grounds thereof, in his entry, to enable the Committee to judge of its validity.

12. Blank reports will be furnished to the Conveners of the different districts. These must, in all details, be completed and lodged with the Secretary *on or before the 1st of November next*, for the approval of the Directors, against whose decisions there shall be no appeal.

13. A report of the Competition and Premiums awarded at the *intermediate* local Shows, in the several districts, signed by a Member of the Society, must be transmitted to the Secretary *on or before the 1st November, in each year*, otherwise the Society's grants shall terminate.

14. It is to be distinctly understood that in no instance does any claim lie against the Society for expenses attending a show of stock beyond the amount of the Premiums offered.

SECTION 2.—DRAUGHT HORSES.

1. *The District of Wester Ross.*
2. *The District of Perth, Fife, Kinross, and Clackmannan.*

Conveners of Committees.

FIRST DISTRICT—Keith W. Stewart Mackenzie of Seaforth.
SECOND DISTRICT—Sir G. Graham Montgomery, Bart., M.P.

PREMIUMS.

1. For the best Stallion, for agricultural purposes, not under three years and nine months, and not above twelve years old,	£25
2. For the best Brood Mare, for agricultural purposes,	10
3. For the best Filly, foaled after 1st January, 1865,	5

These premiums are granted for two years, £30 being contributed by the Society, and £10 by the District.

In 1867,

Nos. 1 and 2 are in competition for the last year.

RULES OF COMPETITION.

1. The Members of the Society in the several Districts are appointed Committees of Superintendence. They shall be convened in the manner and for the purposes prescribed by Nos. 1 and 2 of the Regulations for Cattle Competitions.

2. The Competition for Stallions, and that for Mares and Fillies, may be held at different periods, but both must take place within the districts named, unless, in reference to Stallions, special permission has been obtained to the contrary.

3. If fewer than three animals be exhibited in any class, half the Premium only can be awarded. The Regulations for Cattle Shows, regarding intimation—entry of stock—its exclusion, if of inferior quality—false entries—extra expenses—and the manner in which the Reports are to be certified and transmitted to the Society—are severally applicable to the Premiums for Horses. Evidence must be produced that the Prize Stallions have had produce. Mares must have foals at their feet, or be entered as being in foal; in the latter case payment of the Premiums will be deferred till certificate of birth.

ENTIRE COLTS.

1. *The County of Linlithgow.*
2. *The County of Edinburgh.*
3. *The County of Lanark.*

Conveners of Committees.

FIRST DISTRICT—Sir William Baillie of Polkemmet, Bart.
SECOND DISTRICT—Sir James Gardiner Baird, Bart.
THIRD DISTRICT—J. G. C. Hamilton of Dalzell.

PREMIUMS.

1. For the best Entire Colt, for agricultural purposes, foaled after 1st January 1865,	£6

2. For the best Entire Colt, for agricultural purposes, foaled after 1st January 1866, . . . £4

Four lots in each Class will warrant the award of full, and two lots of half, premiums. The other regulations for Horses are generally applicable. These premiums are granted for two years.

In 1867,

Nos. 1 and 2 are in competition for the last year.
No. 3 is in abeyance on account of the General Show at Glasgow.

SECTION 3.—SHEEP.

The Premiums for sheep are granted for three alternate years, under the same conditions as those for Cattle. See Note, p. 463.

A Silver Medal, as in the case of Cattle, is allowed for the intermediate years.

1. LEICESTER BREED.

1. *The County of Forfar.*
2. *The District of the Border Union Society.*
3. *The County of Edinburgh.*
4. *The Stewartry of Kirkcudbright.*

Conveners of Committees.

FIRST DISTRICT—Sir John Ogilvy, Bart., M.P.
SECOND DISTRICT—Sir George H. Scott Douglas, Bart.
THIRD DISTRICT—Sir James Gardiner Baird, Bart.
FOURTH DISTRICT—Wellwood H. Maxwell of Munches.

1. For the best Tup, belonging to a Proprietor—The Silver Medal.
2. For the best Tup of any age, . . . £5
3. For the best Shearling Tup, ... £5
4. For the best Pen of five Ewes, not more than four Shear, £5
5. For the best Pen of five Gimmers or Shearling Ewes, £4

Proprietors farming the whole of their own lands may compete for the Money Premiums.

In 1867,

Nos. 1 and 2 are in competition for the second year.
No. 3 for the first year.
No. 4 competes for local Premiums.

2. CHEVIOT BREED.

1. *The District of West Teviotdale.*
2. *The County of Peebles.*

3. *The Pastoral District of Ross-shire.*
4. *The County of Sutherland.*
5. *The District of Mull, Coll, and Tyree.*

Conveners of Committees.

First District—Allan Elliott Lockhart of Borthwickbrae.
Second District—Sir G. Graham Montgomery, Bart., M.P.
Third District—Sir Kenneth S. Mackenzie of Gairloch, Bart.
Fourth District—The Duke of Sutherland, or in his absence, George Loch.
Fifth District—Farquhar Campbell of Aros.

1. For the best Tup belonging to a Proprietor—The Silver Medal.
2. For the best Tup of any age, ... £5
3. For the best Shearling Tup, ... £5
4. For the best Pen of five Ewes, not more than four Shear, £5
5. For the best Pen of five Gimmers or Shearling Ewes, £4

Proprietors farming the whole of their own lands may compete for the Money Premiums.

In 1867,

Nos. 1 and 2 are in competition for the last year.
Nos. 3 and 4 for the second year.
No. 5 is in abeyance, on account of the General Show at Glasgow.

3. BLACKFACED BREED.

DISTRICTS.

1. *The District of Lochaber.*
2. *The District of Athole and Weem.*
3. *The District of Badenoch.*
4. *The Upper Ward of Lanarkshire.*
5. *The District of Argyle.*
6. *The District of Lorn.*

Conveners of Committees.

First District—Donald Cameron of Lochiel.
Second District—Sir Robert Menzies of Menzies, Bart.
Third District—Cluny Macpherson.
Fourth District—John Ord Mackenzie of Dolphinton.
Fifth District—William Campbell of Ormsary.
Sixth District—Captain MacDougall of MacDougall.

1. For the best Tup belonging to a Proprietor—The Silver Medal.

2. For the best Tup of any age, . . .	£5
3. For the best Shearling Tup, . . .	£5
4. For the best Pen of five Ewes, not more than four Shear,	£5
5. For the best Pen of five Gimmers or Shearling Ewes,	£4

Proprietors farming the whole of their own lands may compete for the money premiums.

In 1867,

No. 1 is in competition for the last year.
Nos. 2 and 3 for the first year.
Nos. 4, 5, and 6 are in abeyance, on account of the Glasgow Show.

RULES OF COMPETITION.

1. The Members of the Society in the several Districts are appointed Committees as under Nos. 1 and 2 of the Regulations for Cattle Competitions, and they shall be convened in the manner and for the purposes specified in these regulations.

2. The Competition is open to all within the district; it shall take place between the 1st of April and the 20th of October, and the time and place must be publicly intimated by each Convener within his District.

3. Aged Tups shall have served the usual number of Ewes for at least three weeks during the previous season. All prize Tups must serve within the District. Ewes must have reared Lambs during the season.

4. The Premiums shall not be divided. *No Money Premiums shall be adjudged unless there are three lots exhibited, and only one-half if there are not six lots.* Each competitor may show two lots. For the medal two lots are required. The other regulations for cattle competitions,—in regard to the date of entry—the amount of entry-money—the placing of stock—the exclusion of animals which have gained premiums at previous shows—the right of a tenant or factor, under certain circumstances, to compete for the medal—reporting false entries—the regulation as to expenses—the manner in which the reports must be certified and transmitted—and the incompetency of appeal against decisions by the Directors,—are applicable to the premiums for Sheep.

5. Blank reports will be furnished to the Conveners of districts. These must be accurately filled up in all details, signed by the Conveners, and transmitted to the Secretary *by the 1st of November.* Reports of intermediate competitions must be lodged at the same time.

4. SHEARING SHEEP.

The Silver Medal will be given to the best Sheep-shearer in each of the districts in which the premiums for Sheep are in operation.

CONDITIONS.

1. Money premiums must be awarded by the district at each competition to the amount of not less than £2.

2. The district Convener will fix the time and place of competition, and make all necessary arrangements.

3. The medal shall not be awarded unless there are three competitors, and it shall always accompany the highest money premium. If two or

more lots appear to be equally well executed, preference should be given to that executed within the shortest time.

4. The Conveners shall report the particulars of the competition and the award of the Judges to the Society, along with the report of the sheep premiums in the district.

SECTION 4.—SWINE.

DISTRICTS.

1. *The District of Dalkeith.*
2. *The County of Orkney*

Conveners of Committees.

FIRST DISTRICT——Sir James Gardiner Baird, Bart.
SECOND DISTRICT—J. G. Heddle, of Melsetter.

1. For the best Boar belonging to a Proprieter—The Silver Medal.

2. For the best Boar,	£4
3. For the second best,	£2
4. For the best brood Sow,	£3
5. For the second best,	£1

Proprietors farming the whole of their own lands may compete for the money premiums.

The above premiums are given to each district for three consecutive years.

In 1867,

No. 1 is in competition for the last year.
No. 2 for the first year.

RULES OF COMPETITION.

1. The Regulations for cattle competitions are generally to be held as applicable to the premiums for swine; and the Conveners and Committees of the Society's members in the districts are accordingly referred to them.

2. Four lots in each class will warrant the award of full, and two lots of half premiums. There must be at least two competitors for the medal

3. Blank reports will be furnished to the Conveners of districts. These must be accurately filled up in all details, signed by the Conveners, and transmitted to the Secretary *by the first of November next.*

CLASS III.

DAIRY PRODUCE.

DISTRICTS.

1. *The Western District of Mid-Lothian.*
2. *The Lower Ward of Renfrewshire.*

Conveners of Committees.

FIRST DISTRICT—Peter M'Lagan of Pumpherston, M.P.
SECOND DISTRICT—Sir M. R. Shaw Stewart, Bart.

1. BUTTER.

1. For the best sample of Cured Butter (not less than 14 lbs.) belonging to a Proprietor—The Silver Medal.
2. For the best sample of Cured Butter (not less than 14 lbs). £3
3. For the second best, ... £2

2. CHEESE.

5. For the best couple of Sweet Milk Cheeses belonging to a Proprietor—The Silver Medal.
4. For the best couple of Sweet Milk Cheeses, . . £3
6. For the second best £2

Proprietors farming the whole of their own lands may compete for the Money Premiums.

The above Premiums are given to each district for three consecutive years.

In 1867,

No. 1 is in competition for the last year.
No. 2 is in abeyance on account of the Glasgow Show.

RULES OF COMPETITION.

1. The Members of the Society resident within the districts are appointed Committees of Superintendence, for the purposes expressed in the Regulations for Cattle Competitions. Each Committee shall fix such general regulations as they may consider proper, and, in particular, the time and place of competition.

2. Eight Exhibitors in any one class will warrant an award of full, and four of half Premiums. There must be at least two Competitors for the Medal.

3. Competitors must certify that the Butter and Cheese exhibited by them are average specimens of the produce of their Dairies in 1867; and that the quantity produced during the season has not been less than 1 cwt. of Butter, or 2 cwt. of Cheese.

4. In the event of two or more competing lots being deemed equal in quality, the Premium shall be awarded to the Competitor who has made the larger quantity.

5. The successful Competitors, before receiving the Premiums, are required to transmit to the Secretary a detailed report of the whole process followed by them in the manufacture of their Butter or Cheese.

6. Reports of the award of the Premiums to be lodged with the Secretary *ou or before the 1st November next.*

MEDALS FOR CHEESE.

Two Medium Gold Medals will be placed at the disposal of the Ayrshire Association, to be competed for at Kilmarnock The one, for the best lot of Cheddar Cheese—the other, for the best lot of Sweet Milk Cheese of any other variety; the Cheeses, in either case, to be made in Scotland.

Convener of Committee.

Colonel Ferrier Hamilton of Cairnhill.

CLASS IV.

CROPS AND CULTURE.

I.—SEEDS.

The Society, with a view of aiding Local Associations, gives the Silver Medal in the following districts, for Seeds :—

1. County of Ayr : Convener, Sir James Fergusson, Bart., M.P.
    1. Any variety of Wheat.
    2. Any variety of Barley.
    3. Any variety of Oats.
    4. Perennial Ryegrass.

2. County of Stirling : Convener, John Stirling of Kippendavie.
    1. Any variety of Wheat.
    2. Any variety of Barley.
    3. Any variety of Oats.
    4. Any variety of Beans.
    5. Tares.

3. District of Wester Ross : Convener, Keith W. Stewart Mackenzie of Seaforth.
    1. Any variety of Wheat.
    2. Any variety of Barley.
    3. Any variety of Oats.
    4. Perennial Ryegrass.

4. District of the Black Isle : Convener, Major Wardlaw, Belmaduthy.
    1. Any variety of Barley.
    2. Any variety of Oats.

5. County of Caithness : Convener, Alexander Henderson of Stemster.
    1. Any variety of Barley.
    2. Any variety of Oats.

6. Islands of SHETLAND: Convener, John Bruce of Sumburgh.
    1. Any variety of Bere.
    2. Any variety of Oats.
    3. Perennial Ryegrass.

7. District of SPEY, AVON, and FIDDOCHSIDE: Convener, Sir George Macpherson Grant, Bart.
    1. Any variety of Barley.
    2. Any variety of Oats.

8. District of STRATHEARN: Convener, Viscount Strathallan.
    1. Any variety of Oats.

9. District of STRATHSPEY: Convener, The Earl of Seafield.
    1. Early Angus Oats.

10. County of ELGIN: Convener, C. L. Cumming Bruce of Roseisle, M.P.
    1. Any variety of Wheat.
    2. Any variety of Barley.
    3. Any variety of Oats.
    4. Any variety of Turnips.
    5. Any variety of Potatoes.
    6. Perennial Ryegrass.

In 1867,

Nos. 1, 2, 3 and 4 are in competition for the last year.
Nos. 5, 6, 7 and 8 for the third year.
Nos. 9 and 10 for the first year.

RULES OF COMPETITION.

1. In each district the Convener shall fix the time and place of Competition, appoint the Judges, and make all other necessary arrangements, in concurrence with the other Members of the Society, and the local Association of the District. Conveners will be furnished with blank Schedules for reporting the awards.

2. The quantity shown in Competition by each Grower must not be less than three quarters of each variety of Grain, or two quarters of Beans or Grass Seeds. There must at least be two Competitors. The first Premium awarded by the district shall not be less than £1 for each kind of Grain for which a Medal is claimed.

3. The Judges shall be guided in their awards, *1st*, By the purity of the Seed; *2d*, By its freeness from extraneous Seeds; and, *3d*, Where there is an equality in these respects, by the Weight.

4. Successful Competitors must transmit, free of expense, two quarts of each kind of Seed, addressed to the Secretary, at the Society's Hall, 3, George IV. Bridge, Edinburgh.

5. The Returns must show, as accurately as possible, the produce per imperial acre, also the altitude, exposure, and nature of the soil on which

the crops were raised, together with the dates of sowing and reaping, and the weight per bushel. The varieties for which premiums have been given must be named. Reports of the several competitions must be lodged *by the 1st of November.*

6. The Medals will be continued in each District for five consecutive years. Applications from other Districts must be lodged with the Secretary of the Society *by 1st November next.*

2. PLOUGHING COMPETITIONS.

The Silver Medal will be given to the winner of the first or highest Premium at Ploughing Competitions, provided a Report in the following terms is made to the Secretary, within one month of the Competition, by a Member of the Society :—

FORM OF REPORT.

I, of Member of the Highland and Agricultural Society, hereby certify that I attended the Ploughing Match of the Association at in the county of on the when ploughs competed; of land was assigned to each, and hours were allowed for the execution of the work. The sum of £ was awarded in the following proportions, viz. :—

[Here enumerate the names and designations of successful Competitors.]

RULES OF COMPETITION.

1. All Matches must be at the instance of a local Society or Ploughing Association, and no Match at the instance of an individual, or confined to the tenants of one estate, will be recognised.
2. The title of such Society or Association, together with the name and address of the Secretary, must be registered with the Secretary of the Highland and Agricultural Society, 3, George IV. Bridge, Edinburgh.
3. Not more than one Match in the same season can take place within the bounds of the same Society or Association.
4. All Reports must be lodged within one month of the date of the Match, and certified by a Member of the Society who was present at it.
5. A Member can only report one Match, and a Ploughman can only carry one Medal in the same season.
6. To warrant the Medal there must have been fifteen Ploughs in Competition, and Three Pounds awarded in Premiums.
7. Ploughmen shall not be allowed any assistance, and their work must not be set up nor touched by others; on land of average tenacity the ploughing should be at the rate of an imperial acre in ten hours, and attention should be given to the sufficiency of the work below, as well as to its neatness above the surface.

3. REAPING MACHINES.

The Silver Medal will be given to the Servant found most expert at a trial of Reaping Machines, when not fewer than four were in operation, and Premiums to the amount of Two Sovereigns were awarded. Reports must be lodged with the Secretary *not later than the* 1*st of November,* by a Member who has inspected the work.

4. MEDALS IN AID OF PREMIUMS GIVEN BY LOCAL SOCIETIES.

The Society, being anxious to co-operate with local Associations, will give a limited number of Silver Medals annually, in addition to the Money Premiums awarded in the district:—

1. STOCK.—To Local Societies not on the list of District Competitions, awarding Premiums for Stock to the amount of £10, and reporting their Shows to the Secretary—Two Silver Medals for the best Male and Female animals of any Pure Breed.

Applied for by the Western District of Mid-Lothian Association—Convener, Peter M'Lagan of Pumpherston, M.P.
Penicuik Society—Convener, the Right Hon. Sir George Clerk, Bart.
Buchan Society—Convener, George Baird of Strichen.
Wester Ross Club—Convener, Keith W. Stewart Mackenzie of Seaforth.
Spey, Avon, and Fiddochside Association—Convener, Sir George Macpherson Grant, Bart.
Black Isle Society—Convener, Major Wardlaw, Belmaduthy.
Fettercairn Club—Convener, Lieutenant-Colonel MacInroy of The Burn.
Sanquhar Society—Convener, James Veitch of Eliock.
Leochel-Cushnie Society—Convener, Arthur Forbes Gordon of Rayne.
Caithness Society—Convener, Alexander Henderson of Stemster.
Cluny Association—Convener, John Gordon of Cluny.

2. WOOL.—For the best sample of the following wools:—

Laid Cheviot, washed.
Laid Cross, washed.
Laid Blackfaced, unwashed.
Hogg, White Cheviot.
White long.

Silver Medal for each variety.

Applied for by the Inverness Farmers' Club, and subject to its conditions—Convener, Henry W. White of Monar.

3.—For the best managed FARM—The Silver Medal.

Applied for by the Nairnshire Society—Convener, Wm. Alexander Stables, Cawdor Castle.
Inverness Society—Convener, Arthur Forbes of Culloden.
Kincardineshire Club—Convener, Sir Thos. Gladstone, Bart., of Fasque.

Mauchline Society—Convener, C. V. H. Campbell of Netherplace.
Kilmarnock Club—Convener, Frederick J. Turner, The Dean.
Cluny Association—Convener, John Gordon of Cluny.
Spey, Avon, and Fiddochside Society—Convener, Sir George Macpherson Grant, Bart.

4. For the best managed DAIRY—The Silver Medal.

Applied for by the Mauchline Society—Convener, Colonel Ferrier Hamilton.
Kilmarnock Club—Convener, Frederick J. Turner, The Dean.

5. For the best managed GREEN CROP—The Silver Medal.

Applied for by the Bute Society—Convener, John McDougall, Kerrytonlia.
Inverness Society—Convener, Arthur Forbes of Culloden.
Carrick Farmers' Society—Convener, Sir James Fergusson of Kilkerran, Bart., M.P.
Dunblane Club—Convener, John Stirling of Kippendavie.
Leochel-Cushnie Society—Convener, A. Forbes Gordon of Rayne.
Clackmannan Society—Convener, James Johnstone of Alva.
Fettercairn Club—Convener, Lieutenant Colonel MacInroy, of the Burn.
Mauchline Society—Convener, C. V. H. Campbell of Netherplace.
Kincardineshire Club—Convener, Sir Thomas Gladstone of Fasque, Bart.
Kilmarnock Club—Convener, Frederick J. Turner, The Dean.
Cluny Association—Convener, John Gordon of Cluny.
Spey, Avon, and Fiddochside Society—Convener, Sir George Macpherson Grant of Ballindalloch, Bart.
Donside Club—Convener, George Milne of Kinaldie.

6. For the best managed HAY CROP—The Silver Medal.

Applied for by the Clackmannanshire Society—Convener, James Johnstone of Alva.

7. For the best kept FENCES—The Silver Medal.

Applied for by the Kilmarnock Club—Convener, Frederick J. Turner, The Dean.

8. To the most expert HEDGE-CUTTER—The Silver Medal.

Applied for by the Kilmarnock Club—Convener, Frederick J. Turner, The Dean.

9. To the Labourer most expert and efficient in opening, laying, and filling Drains, and otherwise executing the works necessary in thorough Draining—The Silver Medal.

Applied for by the Kilmarnock Club—Convener, Frederick J. Turner, The Dean.

10. For the best SWEET MILK CHEESE—The Silver Medal.

Applied for by the Cumnock Society—Convener, C. V. H. Campbell of Netherplace.
Sanquhar Society—Convener, James Veitch of Eliock.
Stewarton Society—Convener, James Lindsay, Thornhill.
Shetland Society—Convener, John Bruce of Sumburgh.
Androssan Farmers' Society—Convener, David Cuninghame, Chapelton.
Nithsdale Society—Convener, Dr. Russell, Thornhill.
West Linton Society—Convener, W. Allan Woddrop of Dalmarnock

11. For the best CURED BUTTER—The Silver Medal.

Applied for by the Cumnock Society—Convener, C. V. H. Campbell of Netherplace.
Sanquhar Society—Conveuer, James Veitch of Eliock.
Shetland Society—Convener, John Bruce of Sumburgh.
Ardrossan Farmers' Society—Convener, David Cuninghame, Chapelton.
Nithsdale Society—Convener, Dr. Russell, Thornhill.
West Linton Society—Convener, W. Allan Woddrop of Dalmarnock.

12. For the best COLLECTION OF ROOTS—The Silver Medal.

Applied for by the Cumnock Society—Convener, C. V. H. Campbell of Netherplace.
Sanquhar Society—Convener, James Veitch of Eliock.

13. For the best COLLECTION OF SEEDS—The Silver Medal.

Applied for by the Cumnock Society—Convener, C. V. H. Campbell of Netherplace.
Sanquhar Society—Convener, James Veitch of Eliock.
Stewarton Society—Convener, James Lindsay, Thornhill.

The Medals to be issued will be limited to ten in each class, except No. 1.
The Money Premiums given in the District must be £2 in each case, and in No. 1, £10.
Reports of the several Competitions, and applications for Medals in 1868, must be lodged *by 1st November next.*

CLASS V.

COTTAGES AND GARDENS.

The following Premiums are offered for Competition in the Parishes after-mentioned. The Medals and one-half of the Premiums are given by the Society, and the other half is contributed by the respective Parishes.

COTTAGES.

1. For the best kept Cottage in each Parish—One Pound Five Shillings; and where there are four Competitors—The Silver Medal.
2. For the second best—One Pound.
3. For the third best—Fifteen Shillings

GARDENS.

1. For the best kept Cottage Garden in each Parish—One Pound Five Shillings; and where there are four Competitors—The Silver Medal.
2. For the second best—One Pound
3. For the third best—Fifteen Shillings.

Aberdeenshire.

LEOCHEL-CUSHNIE—Convener, Arthur Forbes Gordon of Rayne.
STRICHEN—Convener, George Baird of Strichen.
BIRSE—Convener, James Dyce Nicol of Ballogie, M.P.
LONMAY AND CRIMOND—Convener, Sir Charles Bannerman of Crimonmogate, Bart.

Edinburghshire.

WEST-CALDER—Convener, Robert Steuart of Carfin.
BALERNO—Convener, A. J. Russell, W.S., Edinburgh.

Fifeshire.

MARKINCH—Convener, William Ballingal, Sweetbank.

Lanarkshire.

LESMAHAGOW—Convener, W. E. Hope Vere of Blackwood.
DOUGLAS—Convener, Andrew Smith, Castle Mains, Douglas.

Peeblesshire.

BROUGHTON—Convener, James Tweedie of Quarter.

Perthshire.

FORGANDENNY—Convener, Robert Lyal, Farmhall.
ABERNETHY—Convener, John Bosomworth, Abernethy.
GASK—Convener, Colonel Macdonald Macdonald of St. Martins.

Wigtownshire.

KIRKCOLM—Convener, David Guthrie, Stranraer.
LESWALT—Convener, Sir Andrew Agnew of Lochnaw, Bart., M.P.
STONEYKIRK—Convener, David Frederick, Dumbreddon.

RULES OF COMPETITION.

1. Competitions may take place in the different parishes for Cottages and Gardens, or for either separately.

2. The occupiers of Gentlemen's Lodges and Gardeners' Houses, as well as Gentlemen's Servants occupying Cottages in the Policies, or on land in the natural possession of their masters, are excluded. The inspection must be completed by the 1st of October. In making the inspection, the Conveners may take the assistance of any competent judges.

3. The annual value of each Cottage, with the ground occupied in the parish by a Competitor, shall not exceed £5 sterling. A person who has gained the highest Premium cannot compete again, but will be entitled to a Medal if certified by the Committee to be equal in merit to the first on the list of Competitors.

4. If the cottage is occupied by the proprietor, the roof must be in good repair; if the roof is of thatch, it must be in good repair, though in the occupation of a tenant. The interior and external conveniences must be clean and orderly—the windows must be free of broken glass, clean, and affording the means of ventilation. Dunghills, and all other nuisances, must be removed from the front and gables. In awarding the Cottage Premiums, preference will be given to Competitors who, in addition to the above requisites, have displayed the greatest taste in ornamenting the exterior of their houses, and the ground in front and at the gables.

5. In estimating the claims for the Garden Premiums, the judges should have in view:—The sufficiency and neatness of the fences and walks; the cleanness of the ground; the quality and choice of the crops; and the general productiveness of the garden.

6. Reports, stating the number of competitors, the names of successful parties, and the nature of the exertions which have been made by them, must be transmitted by the Conveners to the Secretary *on or before 1st November next.*

Parishes desirous of these Premiums must lodge applications with the Secretary *on or before the 1st November next.*

MEDALS FOR COTTAGES OR GARDENS.

The Society will issue annually twelve Medals to local Associations or individuals, who at their own expense establish Premiums for Cottages or Gardens.

The Medals will be issued upon a Report by a Member of the Society in the terms required by the preceding conditions, describing the merits of the Cottages or Gardens. The Reports to be lodged with the Secretary on or before the *15th October*, 1867.

Applied for by

The Parishes of Forglen and Alvah.
The Mauchline Horticultural Society.
The Conan and Maryburgh Gardening Society.
The United East Lothian Society.
Arthur Forbes Gordon of Rayne.
Archdeacon Bisset of Lessendrum.
Sir George Macpherson Grant, Bart.
Cromar Horticultural Association.
Breadalbane and Weem Horticultural Society.
West Linton Horticultural Society.
Culross Horticultural Society.

IMPROVING EXISTING COTTAGES.

To the Proprietor in Scotland who shall report the Improvement of the greatest number of Cottages in the years 1864, 1865, and 1866—The Gold Medal.

BUILDING NEW COTTAGES.

To the Proprietor in Scotland who shall report the Erection of the greatest number of approved Cottages during the years 1863, 1864, 1865, and 1866—The Gold Medal.

RULES OF COMPETITION.

1. Claims for the above Premiums must be lodged with the Secretary on or before the 1st of October next, to allow an inspection to be made of the different Cottages. The inspection will be conducted by a Committee of the Society's Members, and Reports must be transmitted to the Secretary *on or before the 1st November.*

2. The annual value of the Cottage or Cottages separately, with the garden ground, must not exceed £5.

3. In estimating the claims of the Competitors, the following points will be kept in view:—The external appearance of the Cottages; their internal accommodation; the arrangements of the out-houses; the means of drainage and ventilation; and the expense of the building or of the alteration, compared with its durability and accommodation. When the Cottages of one Competitor are superior in style and comfort to those of another, though not so numerous, the Inspectors will give them the preference, provided they amount at least to three, and have been erected at a moderate expense.

4. Parties competing will forward to the Society Plans, Specifications, and Estimates, of which, and of all information sent therewith, copies may be taken for publication, if the Society shall see fit, and the originals returned to the parties within six months, if desired.

ACCOMMODATION FOR FARM SERVANTS.

To the Proprietor in Scotland who shall have erected on his estate the most approved Farm-buildings in reference to the proper accommodation of Farm-servants—The Gold Medal.

Reports, Plans, and Specifications to be lodged by the 1st November, 1867.

GENERAL SHOW OF STOCK & IMPLEMENTS,

AT

GLASGOW,

On the 30*th and* 31*st July and* 1*st August*, 1867,

President of the Society—
HIS GRACE THE DUKE OF BUCCLEUCH AND QUEENSBERRY, K.G.

Chairman of the Local Committee—
THE RIGHT HON. LORD BELHAVEN AND HAMILTON, K.T.

The District connected with the Show comprises the Counties of LANARK, AYR, ARGYLE, RENFREW, BUTE, and ARRAN.

The Competition is open to Exhibitors from all parts of the United Kingdom.

Members of the Society are admitted to the Show-Yard at half-price during the judging of Stock. At other periods they have free access.

New Members may be proposed for Election at the General Meeting of the Society in January and June.

PREMIUMS.

NOTE.—*The Medium Gold Medal will be given to any Animal which, having gained the Society's highest Premium at a former Show in the classes of Aged Bulls, Cows, Stallions, or Mares, is disqualified from again competing.*

CLASS I.—CATTLE.

AYRSHIRE.

Section		
1	Best Bull calved before 1st Jan. 1865,	Twenty Sovereigns.
	Second best, ...	Ten Sovereigns.
	Third best, ...	The Bronze Medal.
	Breeder of best Bull, ...	The Silver Medal.
2	Best Bull calved after 1st Jan. 1865,	Twenty Sovereigns.
	Second best, ...	Ten Sovereigns.
	Third best, ...	The Bronze Medal,

Section		
3	Best Bull calved after 1st Jan. 1866,	Ten Sovereigns.
	Second best,	Five Sovereigns.
	Third best,	The Bronze Medal.
4	Best Cow, in Milk, calved before 1st Jan. 1864,	Twenty Sovereigns.
	Second best,	Ten Sovereigns.
	Third best,	The Bronze Medal.
5	Best Cow, in Milk, calved after 1st Jan. 1864,	Fifteen Sovereigns.
	Second best,	Eight Sovereigns.
	Third best,	The Bronze Medal.
6	Best Cow, in Calf, of any age,	Fifteen Sovereigns.
	Second best,	Eight Sovereigns.
	Third best,	The Bronze Medal.
7	Best Heifer calved after 1st Jan. 1865,	Ten Sovereigns.
	Second best,	Five Sovereigns.
	Third best,	The Bronze Medal.
8	Best Heifer calved after 1st Jan. 1866,	Eight Sovereigns.
	Second best,	Four Sovereigns.
	Third best,	The Bronze Medal.

SHORTHORN.

9	Best Bull calved before 1st Jan. 1865,	Twenty Sovereigns.
	Second best,	Ten Sovereigns.
	Third best,	The Bronze Medal.
	Breeder of best Bull,	The Silver Medal.
10	Best Bull calved after 1st Jan. 1865,	Twenty Sovereigns.
	Second best,	Ten Sovereigns.
	Third best,	The Bronze Medal.
11	Best Bull calved after 1st Jan. 1866,	Ten Sovereigns.
	Second best,	Five Sovereigns
	Third best,	The Bronze Medal.
12	Best Cow of any age,	Fifteen Sovereigns.
	Second best,	Eight Sovereigns.
	Third best,	The Bronze Medal.
13	Best Heifer calved after 1st Jan. 1865,	Ten Sovereigns.
	Second best	Five Sovereigns.
	Third best,	The Bronze Medal.
14	Best Heifer calved after 1st Jan. 1866,	Eight Sovereigns.
	Second best,	Four Sovereigns.
	Third best,	The Bronze Medal.

POLLED ANGUS OR ABERDEEN.

15	Best Bull calved before 1st Jan. 1865,	Twenty Sovereigns.
	Second best,	Ten Sovereigns.
	Third best,	The Bronze Medal.
	Breeder of best Bull,	The Silver Medal.

Section		
16	Best Bull calved after 1st Jan. 1865,	Twenty Sovereigns.
	Second best,	Ten Sovereigns.
	Third best,	The Bronze Medal.
17	Best Bull calved after 1st Jan. 1866,	Ten Sovereigns.
	Second best,	Five Sovereigns.
	Third best,	The Bronze Medal.
18	Best Cow of any age,	Fifteen Sovereigns.
	Second best,	Eight Sovereigns.
	Third best,	The Bronze Medal.
19	Best Heifer calved after 1st Jan. 1865,	Ten Sovereigns.
	Second best,	Five Sovereigns.
	Third best,	The Bronze Medal.
20	Best Heifer calved after 1st Jan. 1866,	Eight Sovereigns.
	Second best,	Four Sovereigns.
	Third best,	The Bronze Medal.

POLLED GALLOWAY.

21	Best Bull calved before 1st Jan. 1865,	Twenty Sovereigns.
	Second best,	Ten Sovereigns.
	Third best,	The Bronze Medal.
	Breeder of best Bull,	The Silver Medal.
22	Best Bull calved after 1st Jan., 1865,	Twenty Sovereigns.
	Second best,	Ten Sovereigns.
	Third best,	The Bronze Medal.
23	Best Bull calved after 1st Jan. 1866,	Ten Sovereigns.
	Second best,	Five Sovereigns.
	Third best,	The Bronze Medal.
24	Best Cow of any age,	Fifteen Sovereigns.
	Second best,	Eight Sovereigns.
	Third best,	The Bronze Medal.
25	Best Heifer calved after 1st Jan. 1865,	Ten Sovereigns.
	Second best,	Five Sovereigns.
	Third best,	The Bronze Medal.
26	Best Heifer calved after 1st Jan. 1866,	Eight Sovereigns.
	Second best,	Four Sovereigns.
	Third best,	The Bronze Medal.

HIGHLAND.

27	Best Bull calved before 1st Jan. 1864,	Twenty Sovereigns.
	Second best,	Ten Sovereigns.
	Third best,	The Bronze Medal.
	Breeder of best Bull,	The Silver Medal.

Section		
28	Best Bull calved after 1st Jan. 1864,	Twenty Sovereigns.
	Second best,	Ten Sovereigns.
	Third best,	The Bronze Medal.
29	Best Bull calved after 1st Jan. 1865,	Ten Sovereigns.
	Second best,	Five Sovereigns.
	Third best,	The Bronze Medal.
30	Best Cow of any age,	Fifteen Sovereigns.
	Second best,	Eight Sovereigns.
	Third best,	The Bronze Medal.
31	Best Heifer calved after 1st Jan. 1864,	Ten Sovereigns.
	Second best,	Five Sovereigns.
	Third best,	The Bronze Medal.
32	Best Heifer calved after 1st Jan. 1865,	Eight Sovereigns.
	Second best,	Four Sovereigns.
	Third best,	The Bronze Medal.

FAT STOCK.

33	Best Ox of any Pure or Cross Breed calved after 1st Jan. 1864,	Medium Gold Medal.
	Second best,	The Silver Medal.
	Third best,	The Bronze Medal.
34	Best Ditto, after 1st January 1865,	Medium Gold Medal.
	Second best,	The Silver Medal.
	Third best,	The Bronze Medal.
35	Best Highland Ox calved after 1st January 1863,	Medium Gold Medal.
	Second best,	The Silver Medal.
	Third best,	The Bronze Medal.
36	Best Ditto, after 1st January 1864,	Medium Gold Medal
	Second best,	The Silver Medal.
	Third best,	The Bronze Medal.
37	Best Cross Heifer calved after 1st January 1865,	Medium Gold Medal.
	Second best,	The Silver Medal.
	Third best,	The Bronze Medal.

CLASS II.—HORSES.

FOR AGRICULTURAL PURPOSES

1	Best Stallion foaled before 1st Jan. 1864,	Thirty Sovereigns.
	Second best,	Fifteen Sovereigns.
	Third best,	The Bronze Medal.
	Breeder of best Stallion,	The Silver Medal.

Section		
2	Best Entire Colt foaled after 1st Jan. 1864,	Twenty Sovereigns.
	Second best,	Ten Sovereigns.
	Third best,	The Bronze Medal.
3	Best Entire Colt foaled after 1st Jan. 1865,	Fifteen Sovereigns.
	Second best,	Eight Sovereigns.
	Third best,	The Bronze Medal.
4	Best Entire Colt foaled after 1st Jan. 1866,	Ten Sovereigns.
	Second best,	Five Sovereigns.
	Third best,	The Bronze Medal.
5	Best Mare (with Foal at foot) foaled before 1st Jan. 1864,	Twenty Sovereigns.
	Second best,	Ten Sovereigns.
	Third best,	The Bronze Medal.
6	Best Mare (in Foal) foaled before 1st Jan. 1864,	Fifteen Sovereigns.
	Second best,	Eight Sovereigns.
	Third best,	The Bronze Medal.
7	Best Filly foaled after 1st Jan. 1864,	Ten Sovereigns.
	Second best,	Five Sovereigns.
	Third best,	The Bronze Medal.
8	Best Filly foaled after 1st Jan. 1865,	Eight Sovereigns.
	Second best,	Four Sovereigns.
	Third best,	The Bronze Medal.
9	Best Filly foaled after 1st Jan. 1866,	Six Sovereigns.
	Second best,	Three Sovereigns.
	Third best,	The Bronze Medal.

EXTRA HORSES.

10	Best Mare or Gelding, foaled before 1st January 1863, suitable for Field,	Twenty Sovereigns.
	Second best,	Ten Sovereigns.
	Third best,	The Bronze Medal.
11	Best Mare or Gelding, foaled between 1st January 1863, and 1st January, 1864, suitable for Field,	Twenty Sovereigns.
	Second best,	Ten Sovereigns.
	Third best,	The Bronze Medal.

Section		
12	Best Mare or Gelding, foaled before 1st January 1863, suitable for Harness,	Twenty Sovereigns.
	Second best,	Ten Sovereigns.
	Third best,	The Bronze Medal.
13	Best Draught Mare or Gelding in harness,	Medium Gold Medal.
	Second best,	The Silver Medal.
	Third best,	The Bronze Medal.
14	Best Mare or Gelding, not exceeding 15 hands, for Milk Carts of heavy draught,	Ten Sovereigns.
	Second best,	Five Sovereigns.
	Third best,	The Bronze Medal.
15	Best Mare or Gelding, not exceeding 14½ hands, for Milk Carts of light draught,	Ten Sovereigns.
	Second best,	Five Sovereigns.
	Third best,	The Bronze Medal.

CLASS III.—SHEEP.

LEICESTER.

1	Best Tup not above four shear,	Ten Sovereigns.
	Second best,	Five Sovereigns.
	Third best,	The Bronze Medal.
2	Best Dinmont or Shearling Tup,	Ten Sovereigns.
	Second best,	Five Sovereigns.
	Third best,	The Bronze Medal.
3	Best Five Ewes not above four shear,	Eight Sovereigns.
	Second best,	Four Sovereigns.
	Third best,	The Bronze Medal.
4	Best Five Shearling Ewes or Gimmers,	Eight Sovereigns.
	Second best,	Four Sovereigns.
	Third best,	The Bronze Medal.

CHEVIOT.

5	Best Tup not above four shear,	Ten Sovereigns.
	Second best,	Five Sovereigns.
	Third best,	The Bronze Medal.
6	Best Dinmont or Shearling Tup,	Ten Sovereigns.
	Second best,	Five Sovereigns.
	Third best,	The Bronze Medal.

Section		
7	Best Five Ewes not above four shear,	Eight Sovereigns
	Second best,	Four Sovereigns.
	Third best,	The Bronze Medal.
	Best Pen of Lambs shown with Ewes,	The Silver Medal.
8	Best Five Shearling Ewes or Gimmers,	Eight Sovereigns.
	Second best,	Four Sovereigns.
	Third best,	The Bronze Medal.

BLACKFACED.

9	Best Tup not above four shear,	Ten Sovereigns.
	Second best,	Five Sovereigns.
	Third best,	The Bronze Medal.
10	Best Dinmont or Shearling Tup,	Ten Sovereigns.
	Second best,	Five Sovereigns.
	Third best,	The Bronze Medal.
11	Best Five Ewes not above four shear,	Eight Sovereigns.
	Second best,	Four Sovereigns.
	Third best,	The Bronze Medal.
	Best Pen of Lambs shown with Ewes,	The Silver Medal.
12	Best Five Shearling Ewes or Gimmers,	Eight Sovereigns.
	Second best,	Four Sovereigns.
	Third best,	The Bronze Medal.

SOUTHDOWN.

13	Best Tup not above four shear,	Ten Sovereigns.
	Second best,	Five Sovereigns.
	Third best,	The Bronze Medal.
14	Best Five Ewes not above four shear, or Gimmers,	Eight Sovereigns.
	Second best,	Four Sovereigns.
	Third best,	The Bronze Medal.

LONG-WOOLLED OTHER THAN LEICESTER.

15	Best Tup not above four shear,	Ten Sovereigns.
	Second best,	Five Sovereigns.
	Third best,	The Bronze Medal.
16	Best Five Ewes not above four shear, or Gimmers,	Eight Sovereigns.
	Second best,	Four Sovereigns.
	Third best,	The Bronze Medal.

SHORT-WOOLLED OTHER THAN SOUTHDOWN.

Section		
17	Best Tup not above four shear,	Ten Sovereigns.
	Second best,	Five Sovereigns.
	Third best,	The Bronze Medal.
18	Best Five Ewes not above four shear, or Gimmers,	Eight Sovereigns.
	Second best,	Four Sovereigns.
	Third best,	The Bronze Medal.

CLASS IV.—SWINE.

1	Best Boar, large breed,	Eight Sovereigns.
	Second best,	Four Sovereigns.
	Third best,	The Bronze Medal.
2	Best Boar, small breed,	Eight Sovereigns.
	Second best,	Four Sovereigns.
	Third best,	The Bronze Medal.
3	Best Boar of a breed not eligible for the preceding classes,	Eight Sovereigns.
	Second best,	Four Sovereigns.
	Third best,	The Bronze Medal.
4	Best Sow, large breed,	Six Sovereigns.
	Second best,	Three Sovereigns.
	Third best,	The Bronze Medal.
5	Best Sow, small breed,	Six Sovereigns.
	Second best,	Three Sovereigns.
	Third best,	The Bronze Medal.
6	Best Sow of a breed not eligible for the preceding classes,	Six Sovereigns.
	Second best,	Three Sovereigns.
	Third best,	The Bronze Medal.
7	Best pen of Three Pigs, not exceeding 8 months old, large breed,	Four Sovereigns.
	Second best,	Two Sovereigns.
	Third best,	The Bronze Medal.
8	Best pen of Three Pigs, not exceeding 8 months old, small breed,	Four Sovereigns.
	Second best,	Two Sovereigns.
	Third best,	The Bronze Medal
9	Best pen of Three Pigs, not exceeding 8 months old, of a breed not eligible for the preceding classes,	Four Sovereigns.
	Second best,	Two Sovereigns.
	Third best,	The Bronze Medal.

EXTRA STOCK.

ANIMALS not included in the Sections for Competition may be exhibited as EXTRA STOCK, and will receive HONORARY PREMIUMS when specially commended.

CLASS V.—POULTRY.

Section		
	SILVER-GREY DORKING.	
1	Best Cock and 2 Hens,	The Silver Medal.
	Second best,	The Bronze Medal.
2	Best Cockerel and 2 Pullets,	The Silver Medal.
	Second best,	The Bronze Medal.
	COLOURED DORKING.	
3	Best Cock and 2 Hens	The Silver Medal.
	Second best,	The Bronze Medal.
4	Best Cockerel and 2 Pullets,	The Silver Medal.
	Second best,	The Bronze Medal.
	WHITE DORKING.	
5	Best Cock and 2 Hens,	The Silver Medal
	Second best,	The Bronze Medal.
6	Best Cockerel and 2 Pullets	The Silver Medal.
	Second best,	The Bronze Medal.
	COLOURED COCHIN-CHINA.	
7	Best Cock and 2 Hens,	The Silver Medal.
	Second best,	The Bronze Medal.
8	Best Cockerel and 2 Pullets,	The Silver Medal.
	Second best,	The Bronze Medal.
	WHITE COCHIN-CHINA.	
9	Best Cock and 2 Hens,	The Silver Medal.
	Second best,	The Bronze Medal.
10	Best Cockerel and 2 Pullets,	The Silver Medal.
	Second best,	The Bronze Medal.
	PENCILLED BRAHMAPOOTRA.	
11	Best Cock and 2 Hens,	The Silver Medal.
	Second best,	The Bronze Medal.
12	Best Cockerel and 2 Pullets,	The Silver Medal.
	Second best,	The Bronze Medal.
	LIGHT BRAHMAPOOTRA.	
13	Best Cock and 2 Hens,	The Silver Medal
	Second best,	The Bronze Medal.

Section		
14	Best Cockerel and 2 Pullets	The Silver Medal.
	Second best,	The Bronze Medal.

MALAY.

15	Best Cock and 2 Hens,	The Silver Medal.
	Second best	The Bronze Medal.
16	Best Cockerel and 2 Pullets,	The Silver Medal.
	Second best,	The Bronze Medal.

SPANISH.

17	Best Cock and 2 Hens,	The Silver Medal.
	Second best,	The Bronze Medal.
18	Best Cockerel and 2 Pullets,	The Silver Medal.
	Second best	The Bronze Medal.

SCOTCH GREY.

19	Best Cock and 2 Hens,	The Silver Medal.
	Second best,	The Bronze Medal.
20	Best Cockerel and 2 Pullets,	The Silver Medal.
	Second best,	The Bronze Medal.

GOLDEN PENCILLED HAMBURG.

21	Best Cock and 2 Hens,	The Silver Medal.
	Second best	The Bronze Medal.
22	Best Cockerel and 2 Pullets	The Silver Medal.
	Second best,	The Bronze Medal.

SILVER PENCILLED HAMBURG.

23	Best Cock and 2 Hens	The Silver Medal.
	Second best,	The Bronze Medal.
24	Best Cockerel and 2 Pullets,	The Silver Medal.
	Second best,	The Bronze Medal.

GOLDEN SPANGLED HAMBURG.

25	Best Cock and 2 Hens,	The Silver Medal.
	Second best,	The Bronze Medal.
26	Best Cockerel and 2 Pullets,	The Silver Medal.
	Second best,	The Bronze Medal.

SILVER SPANGLED HAMBURG.

27	Best Cock and 2 Hens,	The Silver Medal.
	Second best,	The Bronze Medal.
28	Best Cockerel and 2 Pullets,	The Silver Medal.
	Second best,	The Bronze Medal.

WHITE CRESTED BLACK POLISH.

29	Best Cock and 2 Hens,	The Silver Medal.
	Second best,	The Bronze Medal.
30	Best Cockerel and 2 Pullets,	The Silver Medal.
	Second best,	The Bronze Medal.

Section		
	GOLDEN SPANGLED POLISH.	
31	Best Cock and 2 Hens,	The Silver Medal.
	Second best,	The Bronze Medal.
32	Best Cockerel and 2 Pullets,	The Silver Medal.
	Second best,	The Bronze Medal.
	SILVER SPANGLED POLISH.	
33	Best Cock and 2 Hens,	The Silver Medal.
	Second best,	The Bronze Medal.
34	Best Cockerel and 2 Pullets	The Silver Medal.
	Second best,	The Bronze Medal.
	GAME—BLACK OR BROWN REDS.	
35	Best Cock and 2 Hens,	The Silver Medal.
	Second best,	The Bronze Medal.
36	Best Cockerel and 2 Pullets,	The Silver Medal.
	Second best,	The Bronze Medal.
	GAME—DUCKWINGS.	
37	Best Cock and 2 Hens,	The Silver Medal.
	Second best,	The Bronze Medal.
38	Best Cockerel and 2 Pullets,	The Silver Medal.
	Second best,	The Bronze Medal.
	ANY OTHER VARIETY OF GAME.	
39	Best Cock and 2 Hens,	The Silver Medal.
	Second best,	The Bronze Medal.
40	Best Cockerel and 2 Pullets,	The Silver Medal.
	Second best,	The Bronze Medal.
	BANTAMS—*Game.*	
41	Best Cock and 2 Hens,	The Silver Medal.
	Second best,	The Bronze Medal.
42	Best Cockerel and 2 Pullets,	The Silver Medal.
	Second best,	The Bronze Medal.
	BANTAMS—*Gold-laced Sebright.*	
43	Best Cock and 2 Hens,	The Silver Medal.
	Second best.	The Bronze Medal.
44	Best Cockerel and 2 Pullets,	The Silver Medal.
	Second best,	The Bronze Medal.
	BANTAMS—*Silver-laced Sebright.*	
45	Best Cock and 2 Hens,	The Silver Medal.
	Second best,	The Bronze Medal.
46	Best Cockerel and 2 Pullets,	The Silver Medal.
	Second best,	The Bronze Medal.
	ANY OTHER VARIETY OF BANTAMS.	
47	Best Cock and 2 Hens,	The Silver Medal.
	Second best,	The Bronze Medal.
48	Best Cockerel and 2 Pullets,	The Silver Medal.
	Second best,	The Bronze Medal.

Section		
	ANY OTHER DISTINCT BREED OF POULTRY.	
49	Best Cock and 2 Hens,	The Silver Medal.
	Second best,	The Bronze Medal.
50	Best Cockerel and 2 Pullets,	The Silver Medal.
	Second best,	The Bronze Medal.
	CAPONS—*Of any Breed.*	
51	Best 3 Capons,	The Silver Medal.
	Second best,	The Bronze Medal.
	DUCKS—*White Aylesbury.*	
52	Best Drake and 2 Ducks,	The Silver Medal.
	Second best,	The Bronze Medal.
53	Best Drake and 2 Ducklings,	The Silver Medal.
	Second best,	The Bronze Medal.
	DUCKS—*Rouen.*	
54	Best Drake and 2 Ducks,	The Silver Medal.
	Second best,	The Bronze Medal.
55	Best Drake and 2 Ducklings,	The Silver Medal.
	Second best,	The Bronze Medal.
	DUCKS—*Any other distinct Breed.*	
56	Best Drake and 2 Ducks	The Silver Medal.
	Second best,	The Bronze Medal.
57	Best Drake and 2 Ducklings,	The Silver Medal.
	Second best,	The Bronze Medal.
	TURKEYS—*Black Norfolk.*	
58	Best Cock and 2 Hens,	The Silver Medal.
	Second best,	The Bronze Medal.
59	Best Cock, and 2 Hens (Poults),	The Silver Medal.
	Second best,	The Bronze Medal.
	TURKEYS—*Any other Breed.*	
60	Best Cock and 2 Hens,	The Silver Medal.
	Second best,	The Bronze Medal.
61	Best Cock and 2 Hens (Poults),	The Silver Medal.
	Second best,	The Bronze Medal.
	GEESE—*Grey Toulouse.*	
62	Best Gander and 2 Geese,	The Silver Medal.
	Second best,	The Bronze Medal.
63	Best Gander and 2 Goslings,	The Silver Medal.
	Second best,	The Bronze Medal.
	GEESE—*Embden.*	
64	Best Gander and 2 Geese,	The Silver Medal.
	Second best,	The Bronze Medal.
65	Best Gander and 2 Goslings,	The Silver Medal.
	Second best,	The Bronze Medal.

CLASS VI.—DAIRY PRODUCE.

Section		
1	Best Sample of Cured Butter,	Five Sovereigns.
	Second best,	Three Sovereigns.
	Third best,	The Bronze Medal.
2	Best Sample of Powdered Butter,	Five Sovereigns.
	Second best,	Three Sovereigns.
	Third best,	The Bronze Medal.
3	Best Sample of Fresh Butter,	Five Sovereigns.
	Second best,	Three Sovereigns.
	Third best,	The Bronze Medal.
4	Best two Sweet Milk Cheeses, Cheddar variety,	Five Sovereigns.
	Second best,	Three Sovereigns.
	Third best,	The Bronze Medal.
5	Best two Sweet Milk Cheeses, any other variety,	Five Sovereigns.
	Second best,	Three Sovereigns.
	Third best,	The Bronze Medal.

CLASS VII.—IMPLEMENTS.

Note.—Premiums for Implements and Machinery have been withdrawn, and trials, during the currency of a Show, discontinued, in terms of a report approved of by a General Meeting of the Society on 21st January, 1863. Reference is made to General Regulations 33, 34, and 35, for the terms on which Implements may now be exhibited, and the conditions under which they will be tried and rewarded.

REGULATIONS.

GENERAL CONDITIONS.

1. Members of the Society are admitted to the Show-Yard without payment, on exhibiting a "*Member's Ticket*," except during the inspection by the Judges, when 5s will be charged. Tickets will be sent to all Members residing in the District connected with the Show—the counties of Lanark, Ayr, Renfrew, Argyle, Bute and Arran. Members residing in other localities must apply for Tickets at the Secretary's Office, 3, George IV. Bridge, Edinburgh, *not later than the 20th of July*.

2. Stock must be the property and in the possession of the Exhibitor from the date of the Entry.

3. Each column in the schedule of Entry must be filled up so far as within the knowledge of the Exhibitor.

4. Stallions and aged Bulls must have had produce, and, along with Two-year-old Bulls, have served within the year of the Show.

5. All Cows must have had calves previous to the Show, and when exhibited, they must either be in milk or in calf; if in milk, birth must have been within 9 months of the Show: if in calf, birth must be certified within 4 months after the Show.

6. Two-year-old Heifers—of the Short-horn and Polled Breeds—must be in calf when exhibited, and birth must be certified within 9 months after the Show.

7. Mares in Section 5 must have produced foals after 1st January 1867, and foals must be at foot, except when death can be proved. Mares in Section 6 must be in foal, and awards will be suspended till birth is certified.

8. All Ewes must have reared Lambs in 1867; and Ewes in Sections 7 and 11 (Cheviot and Blackfaced) must be in milk, and have their Lambs at foot. Fleeces must not be artificially coloured.

9. The Pigs in Sections 7, 8, and 9, must belong to the same litter and be uncut.

10. An animal which has gained a first premium at a General Show of the Society cannot again compete in the same section.

11. No animal shall bear on its rug, harness, pail, or other fittings, any initial, crest, or mark of ownership, nor be distinguished otherwise than by the number indicating its place in the Catalogue.

12. Except for extra Stock, Commendations will only be given for one lot in each Section—the fourth in merit.

13. The violation by an Exhibitor of any one of the Regulations will involve the forfeiture of all Premiums awarded to him.

14. Should it be proved to the satisfaction of the Directors that an animal has been entered under a false name, pedigree, or description, for the purpose of misleading the Directors or Judges as to its qualification or properties, the case shall be reported to the first General Meeting, in order that the Exhibitor shall be disqualified from again competing at the Society's Shows, and his name, if he be a Member, struck from the roll.

15. When an animal has previously been disqualified by the decision of any Agricultural Association in Great Britain or Ireland, such disqualification shall attach, if the Exhibitor, being aware of the disqualification, fail to state it, and the grounds thereof, in his entry, to enable the Directors to judge of its validity.

16. Protests against the awards of the Judges must be lodged with the Secretary not later than 10 A.M. on Wednesday 31st July, and parties must be in attendance at the Committee Room, in the Show-Yard, at 12, when protests will be disposed of.

17. The Society shall not be liable for any loss or damage which Stock, Implements, or other articles may sustain at the Show, or in consequence of having been sent to it.

18. The decisions of the Board of Directors are final in all questions respecting Premiums, and it shall not be competent for any Exhibitor to appeal against such decisions to, nor seek redress in respect of, them from any other tribunal.

19. The Premiums awarded will be paid after the 1st November 1867, and may be taken either in money or in plate.

CERTIFICATES OF ENTRY FOR STOCK.

20. Every Lot must be intimated by a Certificate of Entry, lodged with the Secretary *not later than Wednesday the 12th of June.* Printed forms will be issued on application to the Secretary, or to Messrs M'COWAN & BROWN, Accountants, 87, St. Vincent Street, Glasgow.

21. Admission-Orders to the Yard for Stock and Servants will be forwarded by post previous to the Show.

STALL RENT.

22. Covered accommodation will be provided for the whole of the Stock, and the following rates shall be paid by Exhibitors at the time of making their Entries:—

	Members.		Non-Members.		
	S.	D.	£	S.	D.
Stallions, 3 year old, and 2 year old entire Colts ...	10	0	1	0	0
All other Horses and Cattle, 2 years old and upwards,	7	6	0	15	0
Yearling Colts, Fillies, Bulls, and Heifers..........	5	0	0	10	0
Sheep and Swine, per pen.................... ...	5	0	0	10	0
Poultry, per coop..............................	1	6	0	2	6

ADMISSION OF STOCK.

23. The Yard will be open for Stock on Saturday, 27th July, and Monday, 29th July, and between Six and Eight o'clock on the morning of the 30th of July, after which hour no stock can be admitted.

24. One Servant will be admitted in charge of each Lot. Bulls must be secured by a nose ring, with chain or rope attached.

25. Cattle, Sheep, or Swine cannot be removed from the Yard till Five P.M. on Thursday, 1st August. except on certificate by the Veterinary Surgeon employed by the Directors.

26. Horses may be withdrawn at Six each evening on a deposit of £2 for each animal, which shall be forfeited if the animal is not brought back at Seven o'clock the following morning.

27. Servants in charge of Stock must bring their own buckets or pails. A first bedding for Horses, Cattle, and Swine, will be provided by the Society, but all other fodder and food for Stock will be supplied, at fixed prices hereafter to be published, by a Contractor employed by the Society. Any Servant removing bedding from an adjoining stall will be fined in double the amount taken. Exhibitors may fetch their own cake or corn to the Yard, but not grass, hay, nor straw.

PLACING AND JUDGING STOCK.

28. On Tuesday, 30th July, Exhibitors, and all others except Servants in charge of Stock, must leave the Yard at Eight A.M. The Judges will commence their inspection at Nine o'clock, when the public will be admitted. There shall be no award unless the Judges deem the animals to have sufficient merit, more especially if there is only one lot in a Section; and it shall be in their power to suggest the removal of any lot which appears to them unworthy of being placed in the Yard.

29. A Member of Committee will attend each Section of the Judges. It will be his duty to see that no obstruction is offered to them, and that the space reserved for them is not encroached on; to communicate to the Secretary any question that may arise for the consideration of the Committee; to complete their reports; and to ticket the prize animals.

30. It shall not be competent for any Exhibitor, nor for his Factor or Land-Steward, to act as a Judge or Attending Member in any class in which he is competing; and no Exhibitor shall remain in charge of any lot, whether belonging to himself or another, while the Judges are in the Yard.

ADMISSION OF PUBLIC.

31. The public will be admitted to the Stock-Yard on Tuesday at 9 A.M., immediately before the inspection by the Judges commences. Holders of Members' tickets, and Exhibitors of Stock, will be charged

5s. for admission to the judging; all others 10s. The space reserved for the Judges will be enclosed by ropes, and no encroachment will be permitted.

32. After 2 P.M. on Tuesday, Holders of Members' Tickets and Exhibitors will be admitted free. The charges to others will be—

Tuesday, after 2 P.M., Half-a-Crown.

Wednesday, from 8 A.M. till 1 P.M., Half-a-Crown; and after 1, One Shilling.

Thursday, from 8 A.M. till 5 P.M., One Shilling.

The Implement Yard will be open on Tuesday forenoon while the Stock is being judged; holders of Members' Tickets admitted free; others at 2s. 6d.; thereafter one payment admits to both Yards.

ENTRY OF IMPLEMENTS.

33. All articles must be entered with the Secretary on or before 12th June, and Exhibitors must intimate whether they wish their goods placed under cover or not, and specify the space they require. Shedding will be charged 1s. 6d. per lineal foot of frontage, with a depth of 20 feet, to Members, and 2s. to Non-members.

34. Members may show Implements free if shedding is not required, and Non-members will be charged sixpence per lineal foot.

35. When an Implement or Machine is supposed to embrace a new invention, or radical improvement, the nature of such must be specified in the entry, to enable the Directors to order an inspection with a view to a trial. Such trial, when recommended by the inspecting Committee, will be instituted in a convenient locality, and at a season of the year suitable for the operation of the implement or machine, which, when thoroughly tested, will be entitled to such a Premium as the Directors may see fit to award, on the report of the Judges employed by them.

PLACING IMPLEMENTS IN THE YARD.

36. The Yard will be open for the reception of Implements on Tuesday, 23d July, and till Monday evening, 29th July.

37. There must be attached to each Implement, when forwarded to the Show, a label bearing the Exhibitor's name, and that of the Implement.

38. The articles of each Exhibitor will be all placed in one stand.

39. All articles must remain in the Yard till Five P.M. on Thursday the 1st August, and may be kept there till the afternoon of Friday.

PLACING AND JUDGING POULTRY.

40. Poultry must be brought to the Show-Yard on Monday, 29th July, or between 6 and 8 on the morning of 30th July. No lot will be admitted without an Admission-order. Coops, food, and attendance will be found by the Society.

41. No lot to be removed from the Yard till Five o'clock on Thursday the 1st August.

PLACING AND JUDGING DAIRY PRODUCE.

42. Dairy Produce must be brought to the Show-Yard on Monday 29th July, or between 6 and 8 on the morning of Tuesday 30th. No lot will be admitted without an admission order.

43. Samples of Cured and Powdered Butter not to be less than 14 lbs. Fresh Butter to be in three ½ lb. rolls. Dairy Produce must have been made on the Exhibitor's farm in 1867. At least 1 cwt. of the variety of Butter, and 2 cwt. of that of the Cheese exhibited, must have been made during the season. The lots shall be fair samples, and untasted.

44. The Judges will commence their inspection at Nine on Tuesday 30th July.

45. No article to be removed from the Yard till Five o'clock on Thursday, the 1st August.

Premium Lists, Certificates of Entry, and Regulations, may be obtained by applying to the Secretary, FLETCHER NORTON MENZIES, Esq., No. 3, George IV. Bridge, Edinburgh, or to Messrs M'COWAN AND BROWN, Accountants, 87, St Vincent St., Glasgow.

The Secretary will be at the Queen's Hotel, Glasgow, on Tuesday and Wednesday, 11th and 12th June, to close the list.

GENERAL SHOW OF STOCK AND IMPLEMENTS
AT
ABERDEEN, 1868.

CATTLE.

Premiums will be Offered for the following Classes

SHORT-HORN.

Bulls calved before 1st January . . . 1866
Bulls calved after 1st January . . . 1866
Bulls calved after 1st January . . . 1867
Bull Calves, calved after 1st January . . 1868
Cows of any age.
Heifers calved after 1st January . . . 1866
Heifers calved after 1st January . . . 1867
Heifer Calves, calved after 1st January . . 1868

POLLED ANGUS OR ABERDEEN.

Bulls calved before 1st January . . . 1866
Bulls calved after 1st January . . . 1866
Bulls calved after 1st January . . 1867
Bull Calves, calved after 1st January . . 1868
Cows of any age.
Heifers calved after 1st January . . . 1866
Heifers calved after 1st January . . 1867
Heifer Calves, calved after 1st January . 1868

POLLED GALLOWAY.

Bulls calved before 1st January . . . 1866
Bulls calved after 1st January . . . 1866
Bulls calved after 1st January . . . 1867
Cows of any age.
Heifers calved after 1st January . . . 1866
Heifers calved after 1st January . . . 1867

HIGHLAND.

Bulls calved before 1st January . . . 1865
Bulls calved after 1st January . . . 1865
Bulls calved after 1st January . . . 1866

Cows of any age.	
Heifers calved after 1st January	1865
Heifers calved after 1st January	1866

AYRSHIRE.

Bulls calved before 1st January	1866
Bulls calved after 1st January	1866
Cows in milk of any age.	
Cows in calf of any age.	
Heifers calved after 1st January	1866

FAT STOCK.

Polled Oxen calved after 1st January	1865
Polled Oxen calved after 1st January	1866
Oxen of any other pure or cross breed calved after 1st January	1865
Oxen of any other pure or cross breed calved after 1st January	1866
Highland Oxen calved after 1st January	1864
Highland Oxen calved after 1st January	1865
Cross-bred Heifers calved after 1st January	1865
Cross-bred Heifers calved after 1st January	1866

HORSES

For Agricultural Purposes.

Stallions foaled before 1st January	1865
Entire Colts foaled after 1st January	1865
Entire Colts foaled after 1st January	1866
Entire Colts foaled after 1st January	1867
Mares with foal at foot, foaled before 1st January	1865
Mares in foal, foaled before 1st January	1865
Fillies foaled after 1st January	1865
Fillies foaled after 1st January	1866
Fillies foaled after 1st January	1867

SHEEP.

LEICESTER.

Tups not more than four shear.
Dinmont or Shearling Tups.
Ewes not more than four shear.
Shearling Ewes or Gimmers.

CHEVIOT.

Tups not more than four shear.
Dinmont or Shearling Tups.
Ewes not more than four shear.
Shearling Ewes or Gimmers.

BLACKFACED.

Tups not more than four shear.
Dinmont or Shearling Tups.
Ewes not more than four shear
Shearling Ewes or Gimmers.

SOUTHDOWN.

Tups not more than four shear.
Ewes not more than four shear, or Gimmers.

LONG-WOOLLED OTHER THAN LEICESTER.

Tups not more than four shear.
Ewes not more than four shear, or Gimmers.

SHORT-WOOLLED OTHER THAN SOUTHDOWN.

Tups not more than four shear.
Ewes not more than four shear, or Gimmers

EXTRA SHEEP.

Blackfaced, Cheviot, and Cross-bred Wethers

NOTE.—*Ewes, Gimmers, and Wethers, to be exhibited in pens of five, and in the Cheviot and Blackfaced Breeds, Ewes must be in milk with Lambs at foot.*

SWINE.

Boars, large breed.
Boars, small breed.
Sows, large breed.
Sows, small breed.
Pigs not exceeding 8 months old, large breed.
Pigs not exceeding 8 months old, small breed.

POULTRY.

COCK and 2 HENS, COCKEREL and 2 PULLETS of each of the following breeds:—

Silver-Grey Dorking.
Coloured Dorking.
White Dorking.
Coloured Cochin-China.
White Cochin-China.
Pencilled Brahmapootra.
Light Brahmapootra.
Malay.
Spanish.
Scotch Grey.
Golden Pencilled Hamburg.
Silver Pencilled Hamburg.
Golden Spangled Hamburg.
Silver Spangled Hamburg.
White-crested Black Polish.
Golden Spangled Polish.
Silver Spangled Polish.
Game—Black or Brown Reds.
Game—Duckwings.
Game—Any other variety.
Bantams—Game.
Bantams—Gold-laced Sebright.

POULTRY—(*Continued*).

Bantams — Silver-laced Sebright.
Bantams—Any other variety.
Any other distinct Breed of Poultry.
Ducks—White Aylesbury.
Ducks—Rouen.
Ducks—Any other distinct Breed.
Turkeys—Black Norfolk.
Turkeys—Any other Breed.
Geese—Grey Toulouse.
Geese—Embden.
Capons (coops of 3).

VETERINARY COLLEGE.

The Veterinary College of Edinburgh was established by the Society in 1823, and was conducted by Professor Dick from that date till the period of his death in April 1866. During that time the Society has issued Certificates or Diplomas to 791 Students of the College, who had passed the Examinations instituted by the Board of Directors.

The late Professor Dick at his decease endowed the College, and bequeathed it in trust to the Lord Provost, Magistrates, and Councillors of the City of Edinburgh, continuing to the Society the power to appoint Examiners.

The establishment is now conducted by Professor Hallen, assisted by Dr. Allen Dalzell, Dr. Young, Mr. Strangeways, and Mr. Worthington. The curriculum embraces the Principles and Practice of Veterinary Medicine and Surgery, with Anatomy, Physiology, and Demonstrations; Cattle Pathology; Chemistry; Materia Medica and Dietetics; and the general management of domesticated Animals.

Students have the advantage of assisting in an extensive practice, and of performing the different operations which most frequently occur.

Attendance on Two Courses is required before a Student can be taken upon trial for Diploma by the Society.

The examinations are conducted by leading members of the Medical Faculty and of the Veterinary Profession; and a Diploma bearing the arms of the Society, and signed by the Examiners, is granted to those Students who pass the required examinations.

Graduates of the College are eligible for appointment as Veterinary Surgeons in her Majesty's service.

The Session commences in the beginning of November, and is concluded before the end of April following.

AGRICULTURAL EDUCATION.

The following Bye-Laws have been enacted under the authority of the Supplementary Charter of 1856, and in terms of the Report by the Council on Education thereby created :—

BYE-LAWS.

I. That in terms of a report by the Council on Education the following Board of Examiners be appointed :—

Science and Practice of Agriculture—Mechanics and Construction. —Professor Wilson; George Hope, Fenton Barns; Robert Russell, Pilmuir; and John Wilson, Edington Mains.
Botany.—Professor Balfour.
Chemistry.—Professor Anderson.
Natural History.—Professor Allman.
Veterinary Surgery.—Professor Hallen.
Field Engineering and Surveying.—Professor Macquorn Rankine and David Stevenson, C.E.
Book-Keeping and Accounts.—Kenneth Mackenzie, C.A., and Archibald Paterson, Meadowfield.

II. That the examination shall be both written and oral; that the value of the answers shall be determined by numbers; and that the oral examination shall be public.

III. That there shall be two examinations, to be styled respectively the "Certificate Examination," and the "Diploma Examination." The first to be open to candidates not less than eighteen years of age; the second to those who have completed twenty-one years.

IV. That to pass the "Certificate Examination" a candidate must be acquainted with farm accounts, mensuration, and surveying, and must possess a good knowledge of practical agriculture, and a general acquaintance with the elements of botany, chemistry, and natural history.

V. That a certificate in the following terms, signed by the President or Vice-President of the Council on Education, and by the Secretary, shall be granted to candidates passing this examination :—

"We hereby certify that A. B. has been examined, and has been found to possess a knowledge of farm accounts, mensuration and surveying, a good knowledge of practical agriculture, and a general acquaintance with the elements of botany, chemistry, and natural history, and that he is therefore entitled to present himself for the further examination, in terms of the regulations, for the Society's diploma."

VI. That to pass the "Diploma Examination" a candidate must be in possession of the certificate, and have attained his twenty-first year, and must be found to possess a thorough knowledge of the theory and practice of agriculture; of mechanics and mensuration; of the physiology and treatment of domesticated animals; and of the applications of botany, chemistry, and natural history to agriculture.

VII. That a diploma in the following terms, bearing the corporate seal of the Society, and signed by the President or Vice-President of the Council on Education, and by the Secretary, shall be granted to candidates passing the second examination :—

"These are to certify that on the day of A. B. was examined in the arts and sciences connected with agriculture, and has been reported to be proficient therein by a Board of Examiners nominated by the Council of the Highland and Agricultural Society of Scotland on Education, in terms and by authority of a Charter, given under the Great Seal, on the 18th day of August, 1856."

VIII. That a sum not exceeding £100 per annum shall be placed at the disposal of the Examiners, to be applied in prizes to candidates who pass with distinguished merit, and on a standard exceeding that required for the diploma.

CHEMICAL DEPARTMENT.

The objects of the Chemical Department are threefold :—

I. The prosecution of researches in various subjects connected with Agricultural Chemistry, the results of which are published at intervals in the Transactions.

Dr. Anderson will be glad at all times to receive suggestions from Members of the Society regarding subjects they may consider worthy of investigation, and which will be laid before the Chemical Committee.

II. To assist in the performance of minute and accurate Field Experiments.

For this purpose it has recently been resolved to institute field experiments on a systematic plan, and in such a manner as to obtain exact and comparable results. The experiments will be conducted in different districts under the superintendence of a Committee, who will fix the precise nature of those to be made in each year, and see that the precautions required to secure accuracy are properly attended to. The furnishing the requisite chemical data for these researches will in future form an important part of the business of the laboratory. Gentlemen who have any suggestions to make regarding subjects deserving investigation are requested to communicate with Dr. Anderson.

III. The performance of Analyses of Manures, Soils, Vegetable Products, &c., for members of the Society at reduced fees.

In purchasing manures, cattle foods, &c., Members are recommended, in all cases, to do so by guaranteed analysis, and to ascertain that the article delivered corresponds with it. Partial analyses, such as Nos. 6 and 7 of the accompanying list, will generally suffice to check the correspondence of the stock with the guarantee, and give an *approximate* though not a precise estimate of its value. When an *exact* estimate is required, a complete analysis is necessary.

Samples intended for analysis should be sent (carriage-paid) addressed to Dr. ANDERSON, 15, SHUTTLE STREET, GLASGOW, and when of small size, they are most cheaply and expeditiously forwarded *by post*. They should be distinctly labelled, marked with the name and address of the sender in full, and accompanied by a letter, specifying the particular analysis required, according to its number in the following list,—and, if possible, the object in view,—as, by doing so, much trouble and delay will occasionally be saved.

Some inconvenience having been experienced by persons sending samples for Analysis which had not been selected with sufficient care, and were afterwards found not to represent the average composition of the substance, it is particularly requested that the following instructions may be attended to as closely as circumstances will permit.

INSTRUCTIONS FOR SELECTING SAMPLES FOR ANALYSIS.

Manures.—A large double handful of the Manure should be taken from each of *at least* five or six different bags; and if any lumps are found in it, a due proportion of these should also be taken. The whole being laid on a large sheet of paper, should be carefully mixed by rubbing with the hand, the lumps being broken down and mixed as uniformly as possible with the powdery part. If this mixture be carefully made, a quantity of it not exceeding *two ounces* will suffice for the analysis. It should be folded up in tinfoil to prevent its becoming dry. In default of tinfoil, the sample may be wrapped in double folds of strong writing paper. Should the manure contain stones, or be very moist, or should any difficulty be experienced in making a uniform mixture, it is desirable that *two or three pounds* should be sent.

Soils.—In selecting Soils for analysis, five or six spadefuls should be taken from different parts of the field, and after being spread out in a thin layer for several days to dry, should be put two or three times through a fine sieve, so as to insure uniform mixture. For a complete analysis, not less than *two pounds* should be sent; for a partial analysis, three or four ounces will be sufficient.

Waters.—For the complete analysis of a Water, from *two to three gallons* are required; for the determination of the amount of salts in solution, and lime thrown down by boiling, *two quarts* will suffice. A well water may be selected at any time; but the water of a spring or running stream should be taken in dry weather. The jars or bottles in which they are sent must be tightly corked and sealed. In the analysis of a mineral water, it may sometimes be desirable to determine the amount of gases held in solution; in which case certain precautions must be observed which require the presence of a chemist at the spring.

Limestones, Clays, Ironstones, &c.—If the bed of any of these substances of which the analysis is required be very uniform in appearance, a piece of two or three ounces' weight taken from any part of it will be enough for analysis; but in all cases it is better to send three or four chips from different parts of its thickness. Sometimes where the characters of different parts of the bed vary much, separate analyses of these portions may be requisite, in which case two ounces of each may be sent.

The following are the rates at which analyses, &c., are furnished to *Members of the Society*, and it is requested that the fee be remitted along with the sample:—

1. Complete analysis of a Soil, including determination of Alkalies and Phosphates, £3.
2. A partial analysis of a Soil, such as the determination of the quantity of Organic Matter, and relative proportion of Clay, Sand, and Carbonate of Lime it contains, 10s.
3. Quantitative determination of any one ingredient of a Soil, 7s. 6d.
4. Complete analysis of Saline Manures and other substances, such as Gypsum, Nitrates of Soda and Potash, Ammoniacal Salts, Guano, Oil-cake, Bone-dust, Rape-dust, Superphosphate of Lime, £1.
5. Testing the above substances for adulterations—for each sample, 5s.

   This examination is generally sufficient to determine whether or not any of these substances are grossly adulterated, but it gives no idea of the comparative value of different Samples, where all are genuine.
6. Determination of the percentage of Phosphates and Ammonia in a Guano, 10s.
7. Determining the quantity of Soluble and Insoluble Phosphates in a Superphosphate, 10s.

   This and the preceding determination generally suffice to show whether the sample is of fair quality, and corresponds with the analysis by which it was sold, but not to fix its exact commercial value.

8. Complete analysis of Limestone, Marl, Shell-sand, &c., £1.
9. Examining any of the above substances for the quantity of Lime, and ascertaining in the same the presence of Magnesia and Alumina, 7s. 6d.
   Ascertaining the proportion of these, 2s. 6d. additional for each substance.
10. Complete analysis of the Ash of any Plant, £3.
11. Complete analysis of a Water, £2.
12. Determination of the amount of Salts in Solution, and of the Lime thrown down by boiling in any water, 10s.
13. Analysis of Tile or Fire Clay, £1 10s.
14. Complete analysis of Roots, Grains, and other Vegetable Products, £1.
15. Examining products of Vegetation, or of the Dairy, such as Nutritive Matters in Wheat, or other grain—quantity of Butter or Cheese in Milk—5s. for each ingredient.
16. Determination of the quantity of Nitrogen in any substance, 7s. 6d.
17. Answers to letters asking advice on subjects within the department of the chemist, 5s.

The charges for other Analyses not specified in the list will be settled by the Committee of Management, with reference to the amount of work which they involve, and on a scale similar to the above.

F. N. MENZIES, *Secretary*.

EDINBURGH, *February*, 1867.

LIST OF MEMBERS

OF

THE HIGHLAND AND AGRICULTURAL SOCIETY OF SCOTLAND.

1867.

ALPHABETICALLY ARRANGED, AND DISTINGUISHING
THE YEAR OF ADMISSION.

The Members marked * have been Presidents; and † Vice-Presidents.

New Members are admitted at the Half-Yearly General Meetings in January, and in June or July. The ordinary subscription is £1, 3s. 6d. annually, which may be redeemed by one payment, varying from £12, 12s. to £7, 1s., and regulated by the number of previous annual payments. Tenant Farmers, Secretaries and Treasurers of local Agricultural Associations, resident Agricultural Factors, and Proprietors farming the whole of their own lands, whose assessment on the valuation-roll does not exceed £500, are admitted on a subscription of 10s. annually, or £5, 5s. for life.

LIST OF MEMBERS.

		Admitted
	His Majesty NAPOLEON III., Emperor of the French, *Honorary Associate.*	1856
	His Royal Highness The PRINCE OF WALES, *Honorary Member.*	1864
	*ARGYLL, His Grace George, Duke of, K.T.	1844
	ATHOLE, His Grace John, Duke of	1860
	ATHOLE, Her Grace Ann, Duchess Dowager of	1841
	ABERCORN, The Most Noble James, Marquis of, K.G.	1833
	AILSA, The Most Noble Archibald, Marquis of, K.T.	1847
	†AIRLIE, The Right Hon. David, Earl of, K.T.	1852
	ARBUTHNOTT, The Right Hon. John, Viscount	1833
10	ABERCROMBY, The Right Hon. George, Lord	1862
	ABINGER, The Right Hon. William, Lord	1865
	ARBUTHNOTT, General the Hon. Sir Hugh	1811
	ARBUTHNOTT, The Hon. Mrs, Inchmartine	1864
	ARDMILLAN, The Hon. Lord	1853
	AGNEW, Sir Andrew, of Lochnaw, Bart., M.P.	1850
	ABERCROMBY, Sir George S., of Birkenbog, Bart.	1850
	ANSTRUTHER, Sir Robert, of Balcaskie, Bart., M.P.	1862
	ANTROBUS, Sir Edmond, of Rutherford, Bart.	1829
	ARBUTHNOT, Sir Robert Keith, Bart.	1852
20	ALISON, Sir Archibald, Bart., Sheriff of Lanarkshire	1838
	ALEXANDER, Sir James Edward, of Westerton	1831
	AITCHISON, General Sir John, K.C.B.	1852
	ANDERSON, Sir Alexander, of Blelack, Aberdeen	1838
	Abercromby, Alexander, Glasgow	1844
	Adair, John, of Genoch, Stranraer	1829
	Adam, Alexander Forsyth, W.S., Edinburgh	1859
	Adam, Alexander, of Lynegar, Wick	1862
	Adam, Æneas, Humbertson, Dingwall	1855

		Admitted
	Adam, James, S.S.C., Edinburgh	1842
30	Adam, John, Closeburn, Thornhill	1860
	Adam, Stephen, Wool-Merchant, Leith	1856
	Adam, William, of Ranna, Advocate, Aberdeen	1839
	Adam, William Patrick, of Blair-Adam, M.P.	1853
	Adams, John, S.S.C., Edinburgh	1860
	Adamson, Lawrence, Bankhead, Leven	1858
	Adamson, Samuel, of Drumclyre, Dumfries	1859
	Addie, Robert, of Viewpark, Uddingston	1844
	Adie, Alexander James, Linlithgow	1859
	Agnew, Robert Vans, of Sheuchan, Stranraer	1843
40	Aikman, Thomson, Glasgow	1857
	Ainslie, Daniel, of the Gart, Callander	1864
	Ainslie, David, of Costerton, Blackshiels	1859
	Ainslie, John, Hillend, Pentland, Loanhead	1848
	Ainslie, Robert, of Elvingston, Gladsmuir	1853
	Ainslie, William, Moat, Roslin	1857
	Aitchison, James	1851
	Aitchison, Lieut.-Col., of Drummore, Musselburgh	1865
	Aitchison, William, Linhope, Hawick	1835
	Aitchison, William, junior, Linhope, Hawick	1863
50	Aitken, Alexander, Edinburgh	1857
	Aitken, George, Tyrie, Kirkcaldy	1861
	Aitken, James, of Beechwood, Partick	1857
	Aitken, James, Sunnyside, Prestonkirk	1854
	Aitken, John Gillespie, Stirling	1864
	Aitken, Robert, Drumore, Campbeltown	1857
	Aitken, Thomas, Leith	1860
	Aitken, Thomas, Listonshiels, Balerno	1854
	Aitken, William, Chapel Colliery, Wishaw	1855
	Alexander, Charles, Whitfield, West Linton	1856
60	Alexander, Lieut.-Colonel Claude, of Ballochmyle	1862
	Alexander, Ebenezer, Taylortown, Stirling	1857
	Alexander, James, Seed Merchant, Edinburgh	1857
	Alexander, James, of Balmule, Dunfermline	1842
	Alexander, John, Broughty Ferry	1855
	Alexander, Capt. John, of Southbar, R.N., C.B.	1865
	Alexander, Thomas, Corn Factor, Perth	1861
	Alexander, Wm., Bent of Haulkerton, Laurencekirk	1858
	Alison, James M., Lettoch, Killearnan	1865
	Alison, Thomas, of Calder Mill, Carstairs	1854
70	Allan, Alexander, Advocate, Edinburgh	1833
	Allan, Alexander, Drummond, Evanton	1853
	Allan, Alexander, West Park, Auchterarder	1861
	Allan, Alexander, Carbarns, Wishaw	1864

		Admitted
	Allan, Lieut.-Colonel, Edinburgh	1847
	Allan, James, Clifton Mains, Ratho	1851
	Allan, James, Clauchan, Arran	1855
	Allan, James, West Mains, Stonehouse	1852
	Allan, James D., Culthill, Dunkeld	1863
	Allan, John, Billie Mains, Ayton	1854
80	Allan, John, Crieffvecter, Crieff	1861
	Allan, Richard, Howden, Jedburgh	1863
	Allan, Robert A., Greenburn, Ayton	1863
	Allan, Thomas, Fogorig, Dunse	1853
	Allan, Thomas William Murray	1852
	Allan, William, Edinburgh	1830
	Allen, James, Merchant, Glasgow	1815
	Allman, George James, M.D., Professor of Natural History, University of Edinburgh	1858
	Alston, George, of Craighead, Hamilton	1864
	Alston, James W., of Stockbriggs, Lesmahago	1844
90	Alston, John Patrick, of Muirburn, Strathaven	1850
	Amos, James, Deanfoot, Minto	1863
	Amos, Thomas, Earlside, Hawick	1863
	Anderson, B. T. G., of Tushielaw, Selkirk	1866
	Anderson, A. D., M.D., Glasgow	1844
	Anderson, David, of Moredun, Edinburgh	1825
	Anderson, David, of St Germains, Prestonpans	1829
	Anderson, David, North Mains of Ethie, Arbroath	1858
	Anderson, George, Solicitor, Inverness	1839
	Anderson, George, Glasgow	1844
100	Anderson, George, of Woodhouse, Kirtlebridge	1862
	Anderson, George, Broomhill, Selkirk	1863
	Anderson, George B., Meikle Pinkerton, Dunbar	1859
	Anderson, Henry, of Chapel, Kirkcaldy	1857
	Anderson, Henry, Burnside, Stanley	1861
	Anderson, James,	1839
	Anderson, James,	1838
	Anderson, James, Newbigging, Dundee	1863
	Anderson, James, Solicitor, Inverness	1865
	Anderson, John, Lewinshope, Selkirk	1852
110	Anderson, John, Merchant, London	1838
	Anderson, John, Merchant, Glasgow	1838
	Anderson, John, Craigton, Banchory	1857
	Anderson, John, Pratis, Largo	1857
	Anderson, John, Smithson, Kilsyth	1859
	Anderson, John, Braes of Foss, Pitlochry	1860
	Anderson, Lawrence, Chapel, Moffat	1851
	Anderson, Peter, Gillespie, Glenluce	1864

		Admitted
	Anderson, Robert, of Lochdu, Nairn	1856
	Anderson, Robert H., Burleigh, Kinross	1861
120	Anderson, Robert Hood, Glasgow	1850
	Anderson, Robert Wm., Clerk of Supply, Forfar	1858
	Anderson, Stephen	1849
	Anderson, Thomas, of Glendrisaig, Kilmarnock	1832
	Anderson, Thomas, M.D., Professor of Chemistry, University of Glasgow, Chemist to the Society	1849
	Anderson, Thomas Scott, W.S., Edinburgh	1854
	Anderson, William, Ballimore, Tigh-na-bruaich	1865
	Anderson, William H., Pitcorthie, Anstruther	1867
	Anderson, William, Hattonburn, Banchory	1857
	Anderson, William James, Edinburgh	1840
130	Andrew, Hugh, Keprigan, Campbeltown	1857
	Angus, John, junior, Whitefield, Morpeth	1863
	Anstruther, James, W.S.	1827
	Anton, James, Coltfield, Forres	1858
	Arbuthnot, George Clerk, of Mavisbank, Loanhead	1844
	Arbuthnot, Thomas, of Meethill, Peterhead	1829
	Arbuthnott, James Carnegy, of Balnamoon, Brechin	1813
	Archbald, Thomas, Carrington Mains, Lasswade	1855
	Archer, Andrew, Jordanstoun, Meigle	1846
	Archer, Thomas, Perth	1864
140	Archibald, James, Brodick, Arran	1861
	Archibald, John, Duddingstone, South Queensferry	1849
	Arklay, John, Gorthlick, Inverness	1853
	Arklay, Robert, of Ethiebeaton, Dundee	1861
	Arkley, Patrick, of Duninald, Advocate, Edinburgh	1854
	Arkley, Robert H., Duninald, Montrose	1850
	Armour, Alex. B., Meiklehill, Kirkintilloch	1854
	Armstrong, James, Effgill, Langholm	1860
	Arnot, David, Adamston, Auchterhouse	1862
	Arnott, G. A. Walker, of Arlary, LL.D., Professor of Botany, University of Glasgow	1837
150	Arnott, Thomas R. (Arnott Brothers & Co.), Liverpool	1865
	Arras, Walter, Ormiston, Kelso	1862
	Arres, William, Wester Delnies, Nairn	1865
	Arthur, John	1857
	Arundell, W. F. Hunter, of Barjarg, Dumfries	1858
	Askew, Henry William	1845
	Askew, Watson, of Pallinsburn, Coldstream	1863
	Astley, F. D. P., of Arisaig, Fort-William	1865
	Austin, R. Speir	1851
	Aytoun, James, Advocate	1849
160	Aytoun, Roger S., of Inchdairnie, M.P., Kirkcaldy	1844

		Admitted
	*Buccleuch and Queensberry, His Grace Walter, Duke of, K.G., President of the Society	1828
	Buccleuch and Queensberry, Her Grace Charlotte, Duchess of	1835
	Bowmont, The Most Noble James, Marquis of	1863
	†Blantyre, The Right Hon. Charles, Lord	1843
	†Belhaven and Hamilton, The Right Hon. Lord, K.T.	1816
	†Binning, The Right Hon. George, Lord	1857
	Boyle, The Hon. George Frederick	1854
	Bruce, The Hon. Thomas Charles	1852
	Burnett, Sir James Horn, of Leys, Bart.	1834
170	Bruce, Sir William C., of Stenhouse, Bart.	1864
	Bannerman, Sir Alex., of Crimmonogate, Bart.	1858
	Baird, Sir James Gardiner, of Saughton Hall, Bart.	1843
	Blair, Sir Edward Hunter, of Blairquhan, Bart.	1850
	Baird, Sir David, of Newbyth, Bart.	1860
	Baillie, Sir William, of Polkemmet, Bart.	1847
	Boswall, Sir George Houstoun, of Blackadder, Bart.	1848
	Baxter, Sir David, of Kilmaron, Bart.	1843
	Baikie, James, of Tankerness, Kirkwall	1818
	Baillie, Evan, of Dochfour, Inverness	1824
180	Baillie, Evan P. M., younger of Dochfour, Inverness	1865
	Baillie, Henry James, of Redcastle, M.P.	1839
	Baillie, James William, of Culterallers, W.S., Biggar	1851
	Baillie, John Menzies, C.A., Edinburgh	1865
	Baillie, John B., of Leys, Inverness	1865
	Bain, James, New Grange, St Andrews	1864
	Bain, Edwin Sandys, of Livelands, Stirling	1864
	Baird, Charles J.	1844
	Baird, George, of Strichen, Aberdeen	1838
	Baird, James, of Knoydart, Cambusdoon, Ayr	1838
190	Baird, John, of Ury, Stonehaven	1838
	Baird, William, Grain-Merchant, Glasgow	1844
	Balfour, Arthur J., of Whittingham, Prestonkirk	1863
	Balfour, Charles, of Balgonie, Markinch	1846
	Balfour, David, of Balfour and Trenabie, Kirkwall	1843
	Balfour, Major Fras. W., of Fernie Castle, Ladybank	1857
	Balfour, James, Letham, Leven	1842
	Balfour, John, of Balbirnie, Markinch	1839
	Balfour, John Hutton, M.D., Professor of Botany, University of Edinburgh	1839
	Balfour, Major-General, of Arbigland, Dumfries	1849
200	Balfour, William, of Birstane, Kirkwall	1844
	Ballantyne, James, of Castlehill, Ayr	1822
	Ballantyne, James, of Holylee, Innerleithen	1832

		Admitted
	Ballantyne, John, junior, Seedsman, Dalkeith	1860
	Ballantyne, Thomas, Whitehope, Selkirk	1852
	Ballingal, Neil, Bingartree House, Leslie	1851
	Ballingall, Robert, Eallibus, Islay	1853
	Ballingall, David, Factor, Blairdrummond	1857
	Ballingall, George, Ayton, Cupar-Fife	1860
	Ballingall, John, Dunbog, Newburgh	1861
210	Ballingall, William, Sweetbank, Markinch	1859
	Balmer, Thomas, Gordon Castle, Fochabers	1863
	Bankes, Meyrick, of Letterewe, Dingwall	1862
	Barbour, George F., of Bonskeid, Pitlochry	1859
	Barbour, Thomas, of Dalshangan, Carsphairn	1846
	Barclay, Arthur Hay, of Paris, Perthshire	1848
	Barclay, Charles A., Aberdour House, Fraserburgh	1858
	Barclay, George, Davochbeg, Golspie	1855
	Barclay, George, Yonderton, King Edward	1858
	Barclay, George Robertson, of Keavil, Dunfermline	1834
220	Barclay, James Wm., Auchlossan, Lumphanan	1862
	Barclay, Colonel P., Edinburgh	1847
	Barclay, Robert, Drums, Falkland	1859
	Barclay, Thomas, Montrose	1855
	Barclay, Thomas, Skelbo, Dornoch	1865
	Bardner, James, Chesterstone, Largo	1859
	Barker, Thomas, Sydney, Australia	1839
	Barr, James, Law Colliery, Carluke	1862
	Barr, John, Harperland, Kilmarnock	1851
	Barrie, James, Harden Mains, Jedburgh	1863
230	Barron, George, Pittenkerie, Banchory	1857
	Barstow, Charles M., C.A., Edinburgh	1846
	Bartholomew, James, Duntarvie, Winchburgh	1855
	Bartholomew, Robert, Merchant, Glasgow	1838
	Bateson, Samuel S., Cambusmore, Golspie	1865
	Bathgate, James, Bower House, Lauder	1861
	Baxter, Edmund, W.S., Edinburgh	1854
	Baxter, George, Craigforthie, Keith Hall	1858
	Bayley, Isaac, of Manuel, Edinburgh	1828
	Bayne, John, Bridge of Allan	1854
240	Bayne, William, Foodie, Cupar-Fife	1862
	Beach, Joseph, Flour Mills, Dudley	1865
	Beattie, James, Newbie House, Annan	1854
	Beattie, Peter, Dunnydeer, Insch	1858
	Begbie, Alexander, Barneyhill, Dunbar	1864
	Begbie, Thomas, Queenston Bank, Drem	1852
	Begg, David, of Canons Park, Edgeware, London	1862
	Begg, John, Distiller, Balmoral, Crathie	1858

		Admitted
	Beith, John, Grain-Dealer, Rothesay	1857
	Beith, John, Banker, Campbeltown	1836
250	Belany, Charles, Hillend, Ayton	1854
	Belfrage, George, North Gyle, Corstorphine	1849
	Belfrage, James Samuelston, East Mains, Haddington	1849
	Bell, David, Todhall, Cupar-Fife	1856
	Bell, George Graham, of Crurie, Advocate	1835
	Bell, James, Woodhouselees, Canonbie	1863
	Bell, John, Glenduckie, Newburgh, Fife	1859
	Bell, John, of Enterkine, Tarbolton	1839
	Bell, John (R. F. Bell & Sons), Leith	1863
	Bell, John Beatson, W. S., Edinburgh	1841
260	Bell, Robert, of Lunna, Sheriff-Substitute, Falkirk	1846
	Bell, Thomas, Ballinshoe, Kirriemuir	1856
	Bell, Thomas, Glentarkie, Strathmiglo	1865
	Bell, William, Edinburgh	1855
	Bennet, James, Marypark, Ballindalloch	1857
	Benton, Joseph, Cattie, Whitehouse	1858
	Benton, William, Harthill, Whitehouse	1858
	Berry, John, of Tayfield, Tayport	1848
	Berry, Walter, Edinburgh	1863
	Bertram, George, Engineer, West Sciennes, Edinburgh	1860
270	Bertram, James, Hartside, Lauder	1864
	Bertram, John S., Cranshaws, Dunse	1854
	Bertram, Thomas Hardy, Engineer, London	1845
	Bertram, William, of Nisbet, Biggar	1852
	Berwick, David, Collairnie, Cupar-Fife	1861
	Bethune, Admiral, of Balfour, C.B., Markinch	1857
	Bethune, Alexander, of Blebo, Cupar-Fife	1848
	Bethune, Major Robert, of Nydie, St Andrews	1863
	Bethune, Murdo, Dreim, Beauly	1864
	Bett, David J., Flatfield, Cupar-Angus	1861
280	Bett, James, Easdale, Oban	1857
	Beveridge, David, Buckthorn, Largo	1859
	Beveridge, George, Orrick, Bruntisland	1862
	Beveridge, James, Easter Balado, Kinross	1851
	Beveridge, Robert E., Urquhart, Dunfermline	1853
	Beveridge, William, Orrick, Burntisland	1862
	Bigg, Thomas, London	1842
	Biggar, Thomas, of Chapleton, Haugh of Urr	1858
	Binnie, John, Eshiels, Peebles	1859
	Binnie, Robert, Seton Mains, Longniddry	1847
290	Binning, John, Brae, Dingwall	1849
	Binny, Graham, W.S., Edinburgh	1865
	Bird, James B., Fishwick, Paxton	1858

		Admitted
	Biscoe, Thomas Porter Bonell, of Newton, Inverness	1846
	Bisset, The Ven. Archdeacon, of Lessendrum, Huntly	1862
	Black, Adam, Edinburgh	1846
	Black, Alexander, Civil-Engineer, Falkirk	1856
	Black, Alexander, North Navey, Meigle	1865
	Black, David, Barrelwell, Brechin	1850
	Black, James, London	1851
300	Black, James, Merchant, Glasgow	1838
	Black, James, Knock, Keith	1852
	Black, James W., Wandelmill, Abington	1857
	Black, John, of Tilliwhally, Kinross	1851
	Black, John, Fern Bank, Bishopbriggs	1855
	Black, John, Seton Hill, Longniddry	1859
	Black, John, Westfield, Coldstream	1859
	Black, Robert, Glasgow	1844
	Blackburn, Peter, of Killearn, Drymen	1842
	Blackburn, Robert B., Advocate, Edinburgh	1846
310	Blackie, Archibald Gibson, Peebles	1858
	Blackie, John, junior, Glasgow	1865
	Blackley, John, Glasgow	1855
	Blacklock, Adam, Minnygap, Moffat	1857
	Blackwood, John, Publisher, Edinburgh	1842
	Blackwood, William, Publisher, Edinburgh	1862
	Blair, Alexander, Brewer, Alloa	1864
	Blair, Campbell, Glasgow	1864
	Blair, Col. Stopford, of Penninghame, Newton-Stewart	1849
	Blair, James, of Glenfoot, Tillicoultry	1860
320	Blair, James, Rowardennan, Luss	1864
	Blair, John, Clayhills, Cambusbarron, Stirling	1864
	Blair, William, of Avontoun, Linlithgow	1817
	Blair, Captain William Fordyce, of Blair, R.N., Dalry	1844
	Blandow, M. Von, St. Petersburg, Hon. Associate	1836
	Blane, Col. Robert, C.B.	1836
	Blanshard, George, Merchant, Edinburgh	1847
	Blues, Andrew A., Dalruscan, Tinwald, Dumfries	1861
	Blyth, David, Leckiebank, Auchtermuchty	1861
	Bogie, Alexander, of Newmill, Cupar-Fife	1850
330	Bogie, James, Newport, Fifeshire	1864
	Bogie, John, Balcanquhall, Auchtermuchty	1851
	Bogie, William, Balneil, Colinsburgh	1861
	Bolam, John, Glororum, Belford	1854
	Bolam, John, junior, Chathill, Northumberland	1863
	Bolam, Robert George, Weetwood Hall, Wooler	1866
	Bolton, Joseph C., of Carbrook, Falkirk	1858
	Bonar, Andrew, Australia	1824

		Admitted
	Bonar, William Graham, of Greigston, Ceres	1835
	Bontine, Wm. Cuninghame Graham, of Gartmore	1853
340	Booth, James Godfrey, Seed Merchant, Hamburg	1842
	Borland, Robert, Auchencairn, Closeburn	1862
	Borthwick, Alex. Hay, Mosspeeble, Langholm	1859
	Borthwick, Gilbert, Cowbog, Kelso	1854
	Borthwick, John, Greenlees, Kelso	1863
	Borthwick, John, V.S., Kirkliston	1858
	Borthwick, John, of Crookston, Gorebridge	1846
	Borthwick, John James M., Georgefield, Langholm	1859
	Borthwick, Thomas Chalmers, Hopsrig, Langholm	1838
	Borthwick, Wm. Henry	1857
350	Borthwick, Wm., Whitehaven Castle, Whitehaven	1865
	Borton, John, Barton House, Malton	1864
	Bosomworth, John, Abernethy	1861
	Bowhill, James, Banker, Ayton	1863
	Bowie, Alexander, Mains of Kelly, Arbroath	1854
	Bowie, Peter, Carlogie, Carnoustie	1858
	Bowman, James, Newark, Pittenweem	1859
	Bowman, Thomas, Hallhill, Baillieston	1855
	Boyd, James B., Doddington, Wooler	1853
	Boyd, John B., of Cherrytrees, Kelso	1861
360	Boyd, Major James Hay, of Townend, Kilmarnock	1865
	Boyd, William B., Hetton Hall, Belford	1863
	Boyle, Patrick, of Shewalton, The Knowe, Ayr	1835
	Braid, Andrew, Humbie, Kirknewton	1865
	Brand, Charles, Mains of Fordoun, Fordoun	1858
	Brand, William, Secretary, Union Bank of Scotland	1846
	Brander, James, Avoch, Fortrose	1830
	Brash, James, Hallyards, Kirkliston	1855
	Brebner, James, Advocate, Aberdeen	1834
	Brims, James, Thurso	1865
370	Broad, William, Clifton-hill, Kelso	1853
	Broadwood, David, of Fullfordlees, Crowhill, Dunbar	1865
	Brock, John, Overton, Kirkliston	1858
	Brockley, Robert M., Gourlaw, Lasswade	1857
☛	Brodie, Duncan, of Polder, Bridge of Allan	1867
	Brodie, James, Banker, Kirriemuir	1859
	Brodie, James, Leaston, Blackshiels	1848
	Brodie, John Clerk, of Idvies, W.S., Edinburgh	1840
	Brodie, K. S., Edinburgh	1860
	Brodie, William, of Brodie, Forres	1821
380	Brody, George, 49, Minto Street, Edinburgh	1864
	Broomfield, Thomas, Lauder	1855

		Admitted
	Brown, Adam, Helmburn, Selkirk	1863
	Brown, Alex. J. Dennistoun, of Balloch, Dumbarton	1844
	Brown, Andrew, M.D.	1852
	Brown, Archibald, Craig, Udny	1858
	Brown, David, Banker, Maybole	1866
	Brown, George, Watten Mains, Wick	1839
	Brown, George, Balgarvie, Cupar-Fife	1851
390	Brown, George, Westerton, Fochabers	1858
	Brown, James, Hargrave, Annan	1860
	Brown, James, of Lochton, Dundee	1843
	Brown, James, of Orchard, Carluke	1849
	Brown, James, Whinpark, Kilmarnock	1865
	Brown, James, Clephanton Cottage, Anstruther	1861
	Brown, James, Liberton Mains, Carnwath	1855
	Brown, James T., of Auchlochlan, Lesmahagow	1837
	Brown, John, Outerston, Gorebridge	1856
	Brown, John, Boghall, Biggar	1857
400	Brown, John, Inglistone, Irongray, Dumfries	1860
	Brown, John George, Auchlochan	1852
	Brown, J. Carruthers, Bridekirk Mains, Annan	1860
	Brown, Matthew, Greenock	1832
	Brown, Oliphant, Glenlee, New Galloway	1861
	Brown, Peter, Linkwood, Elgin	1821
	Brown, Peter, Rossland, Paisley	1856
	Brown, Robert, Auctioneer, Balfron	1856
	Brown, Robert, Sandyflat, Maryhill	1857
	Brown, Robert, Bankhead, Cluny, Aberdeen	1866
410	Brown, Robert E., Wass, Oswald Kirk, Yorkshire	1866
	Brown, Thomas, Slipperfield, West Linton	1849
	Brown, Thomas, Holm, Thornhill	1863
	Brown, Thomas, Ruletownhead, Bonchester Bridge	1863
	Brown, Thomas, Secy. Agricul. Soc., Campbeltown	1863
	Brown, Walter, of Colton, Dunfermline	1854
	Brown, Dr. William, Melrose	1855
	Brown, William, Merchant, Glasgow	1828
	Brown, William, Banker, Maybole	1835
	Brown, William, Linkwood, Elgin	1854
420	Brown, William, Factor, Invercauld	1861
	Brown, William Bertram, Smeaton, Dalkeith	1862
	Brown, William Henry, of Ashley, Ratho	1833
	Bruce, A., Wealtherton of Keig, Whitehouse	1858
	Bruce, C. L. Cumming, of Roseisle and Kinnaird, M.P.	1817
	Bruce, Charles, Broadland, Huntly	1862
	Bruce, George, Hayfield, Lerwick	1864
	Bruce, James, Burnside, Fochabers	1865

		Admitted
	Bruce, John, of Sumburgh, Zetland	1829
	Bruce, John, junior, Sumburgh, Shetland	1863
430	Bruce, John, W.S., Edinburgh	1842
	Bruce, Peter, St Bernard's Cottage, Edinburgh	1865
	Bruce, Thomas, of Arnot, Kingsdale, Kennoway	1855
	Bruce, William, of Symbester, Zetland	1838
	Brunton, James, Broomlands, Kelso	1866
	Brunton, John S., Eastfield, Bowden, Selkirk	1867
	Bryce, David, Architect, Edinburgh	1846
	Bryce, James, East Whitburn, Whitburn	1865
	Brydon, Adam, Netherbarns, Galashiels	1862
	Brydon, Herbert, Thirlestane Hope, Ettrick	1864
440	Brydon, James, Moodlaw, Langholm	1850
	Brydon, James, junior, Kinnelhead, Moffat	1864
	Brydon, John, Mounthooly, Jedburgh	1857
	Brydon, Walter, Burncastle, Lauder	1863
	Bryson, Robert, Merchant, Glasgow	1850
	Bryson, W. G., Cullen	1852
	Buchan, Colonel Fordyce, of Kelloe, Edrom	1857
	Buchan, Matthew, Beechwood Mains, Corstorphine	1861
	Buchan, William, Dolphinton, South Queensferry	1839
	Buchanan, Alexander, Whitehouse, Stirling	1854
450	Buchanan, Alexander, Garscadden, East Kilpatrick	1857
	Buchanan, Andrew, of Mount Vernon, Shettleston	1827
	Buchanan, Andrew, of Auchintorlie, Dunglass	1838
	Buchanan, David Carrick, of Drumpellier, Coatbridge	1849
	Buchanan, Dun., Auchenbreck, Colmtrain, Greenock	1853
	Buchanan, Isaac, Canada	1851
	Buchanan, James, Glasgow	1838
	Buchanan, John, London	1838
	Buchanan, John, of Glenlora, Lochwinnoch	1844
	Buchanan, John, of Carbeth, Killearn	1838
460	Buchanan, John, Coldrach, Drymen	1857
	Buchanan, Robert, Glasgow	1811
	Buchanan, Robert M., Livingston Mill, Mid Calder	1864
	Buchanan, Thomas Gray, of Wellshot, Glasgow	1849
	Buchanan, Walter, of Shandon, Glasgow	1842
	Buchanan, William, Merchant, Glasgow	1828
	Buckham, George, Kers Mains, Kelso	1863
	Budge, Henry, C.A., Edinburgh	1864
	Buist, James, Kirkton Barns, Newport	1842
	Buist, Matthew, Tynninghame, Prestonkirk	1848
470	Buist, Robert, Cattle Salesman, Edinburgh	1863
	Bulloch, Archibald, Milliken, East Kilpatrick	1865
	Burn, John, Ednam, Kelso	1863

		Admitted
	Burn, Robert Scott, Highfield Lodge, Manchester	1860
	Burn, William, Architect, London	1824
	Burnet, James, Craigielaw, Aberlady, Drem	1854
	Burnett, George, Advocate, Edinburgh	1848
	Burnett, Gregory, Dee Cottage, Flint	1840
	Burnett, Newell, Advocate, Aberdeen	1834
	Burnett, Robert, yr. of Leys, Crathes, Aberdeen	1858
480	Burroughs, Lieut.-Col. W. F. Trail, of Rolfsea, Orkney	1854
	Burnley, W. F., Edinburgh	1838
	Burns, James C., of Glenlee, Hamilton	1865
	Burns, John, of Castle Wemyss, Greenock	1865
	Burns, John William, yr. of Kilmahew, Dumbarton	1861
	Bursby, George G., Kirkhouse, Traquair	1859
	Burt, Dr. John, Edinburgh	1831
	Burton, James Tait, of Toxside, Gorebridge	1867
	Burton, John, Rosewell Mains, Lasswade	1857
	Buttar, David, Corston, Coupar-Angus	1861
490	Butter, Archibald, of Faskally, Pitlochry	1825
	Buttery, A. W., Glasgow	1844

	CRAWFORD and BALCARRES, The Right Hon. James, Earl of	1847
	†CAITHNESS, The Right Hon. James, Earl of	1845
	CAWDOR, The Right Hon. John, Earl	1839
	COLVILLE (of Culross), The Right Hon. Charles, Lord	1851
	CARNEGIE, The Hon. Charles, M.P.	1856
	CLERK, The Right Hon. Sir George, of Penicuik, Bart., Honorary Secretary of the Society	1812
	CRAIG, The Right Hon. Sir William Gibson, of Riccarton, Bart., Treasurer of the Society	1824
	CURRIEHILL, The Hon. Lord	1822
500	COLQUHON, Sir James, of Luss, Bart.	1829
	CAMPBELL, Sir James, of Aberuchil, Bart.	1838
	CARMICHAEL, Sir William H. Gibson, of Castle-Craig and Skirling, Bart.	1856
	CAMPBELL, Sir George, of Succoth, Bart.	1867
	CAMPBELL, Sir Hugh Hume, of Marchmont, Bart.	1834
	CATHCART, Sir John Andrew, of Carleton, Bart.	1834
	COLEBROOKE, Sir Thomas Edward, of Crawford, Bart., M.P.	1838
	CAMPBELL, Sir Alexander, of Barcaldine, Bart.	1845
	CAMPBELL, Sir James, of Stracathro, Glasgow	1838
	COCHRANE, Admiral Sir Thomas, G.C.B.	1817

		Admitted
510	Cadell, Alex. Todd, R.A., Madras	1844
	Cadell, Henry, of Grange, Bo'ness	1856
	Cadell, Hew Francis, of Cockenzie, Prestonpans	1844
	Caird, James, of Cassencarie, Creetown	1853
	Cairns, George, Edinburgh	1857
	Cairns, James, Dollar Bank, Dollar	1864
	Cairns, William, Ballinloan, Dunkeld	1861
	Calder, Francis, Yetholm Mains, Kelso	1853
	Calder, James, Colgrain, Cardross	1857
	Calder, Marcus, Shapinshay, Kirkwall	1846
520	Calder, Robert, Kelloe Mains, Edrom	1857
	Calder, Robert, Whitehouse, Lumphanan	1858
	Calder, William, Cattle-Salesman, Edinburgh	1851
	Calder, James H., Swinton Hill, Coldstream	1863
	Caldwell, Frederick, of Missnish	1841
	Caldwell, William, Boydstone, Ardrossan	1862
	Callender, Henry, C.A., Edinburgh	1843
	Cameron, Alexander, Strone, Fort-William	1854
	Cameron, Alexander, Bogside, Springburn, Glasgow	1857
	Cameron, Alexander, of Mainhouse, Elgin	1865
530	Cameron, Rev. Allan Gordon, of Barcaldine, Bonaw	1865
	Cameron, Donald, of Lochiel, Fort-William	1859
	Cameron, Donald Colin, Tallisker, Broadford	1861
	Cameron, Hugh Innes, London	1835
	Cameron, James, Balnakyle, Munlochy	1857
	Cameron, Peter, Edinburgh	1850
	Cameron, William, Millhill, Auchterarder	1852
	Cameron, William, Edinburgh	1862
	Campbell, Alexander, of Auchindarroch, Lochgilphead	1837
	Campbell, Alex. Cameron, of Monzie, Fort-William	1833
540	Campbell, Alexander, Edinburgh	1835
	Campbell, Alexander, Crosshill, Bishopbriggs	1857
	Campbell, Alex. Henry, of Little Grove, Herts	1863
	Campbell, Archibald, of Glendaruel	1826
	Campbell, Archibald, Broomhall, Aberfeldy	1832
	Campbell, Archibald, of Blythswood, Renfrew	1848
	Campbell, Lt.-Col. Archd., yr. of Blythswood	1857
	Campbell, Archibald, Park, Aberdeen	1865
	Campbell, Lt.-Col. A. H., Retired List, Bengal Army	1865
	Campbell, Lt.-Col., of South Hall	1865
550	Campbell, Arthur, of Catrine, W.S., Edinburgh	1816
	Campbell, Arthur, yr. of Catrine, W.S., Edinburgh	1854
	Campbell, Major-General, of Kinloch, Dunkeld	1865
	Campbell, C. Macpherson, of Ballimore, Tighnabruaich	1864
	Campbell, Charles Vereker Hamilton, of Nether Place	1853

		Admitted
	Campbell, Colin, of Colgrain, Dumbarton	1847
	Campbell, Colin, of Stoneyfield, Oban	1858
	Campbell, Colin G., of Stonefield, Tarbert	1838
	Campbell, Colin Yorke, of Barbreck, Captain R.N.	1858
	Campbell, David, Kirkforthar, Markinch	1854
560	Campbell, Donald, Pennyglead House, Tobermory	1846
	Campbell, Donald, Ulva, Aros	1857
	Campbell, Dugald M'Neill, of Kintarbet, Tarbert	1847
	Campbell, Duncan T., Duiletter, Dalmally	1858
	Campbell, Farquhar, of Aros, Tobermory	1839
	Campbell, George William, Mayfair, London	1863
	Campbell, George J., of Treesbank, Kilmarnock	1835
	Campbell, Henry Fletcher, of Boquhan, Kippen	1823
	Campbell, Hugh, Surgeon, Glenralloch, Tarbert	1861
	Campbell, Ivie, Dalgig, New Cumnock	1856
570	Campbell, James, London	1838
	Campbell, James, of Tillichewan, Dumbarton	1847
	Campbell, James, Kilkea, Athy, Ireland	1850
	Campbell, James Archibald, of Inverawe	1833
	Campbell, James A., yr. of Stracathro	1849
	Campbell, James G., Killyleoch, Dunscore, Dumfries	1860
	Campbell, John, of Possil, Torosay, Oban	1848
	Campbell, John, of Strachur	1829
	Campbell, John, of Achalader, Blairgowrie	1846
	Campbell, Rev. John, Killin	1858
580	Campbell, John, Remnil, Campbeltown	1857
	Campbell, John, of Inverardoch, Doune	1857
	Campbell, John, of Ardfinaig, Ross of Mull, Aros	1857
	Campbell, John Deans, of Curreath, Troon	1835
	Campbell, John D., of Peaton, Clachan, Roseneath	1865
	Campbell, John Graham, of Shirvan, Lochgilphead	1863
	Campbell, Kenneth, of Ardow, Tobermory	1843
	Campbell, Major-General, C.B.	1857
	Campbell, Neil Colquhoun, of Barnhill, Dumbarton	1853
	Campbell, Ord Graham, Edinburgh	1838
590	Campbell, Richard D., of Jura	1836
	Campbell, Robert, of Sonachan, Inverary	1802
	Campbell, R. F. F., of Craigie, Ayr	1861
	Campbell, Rose	1809
	Campbell, Silvester, Kinnellar, Blackburn, Aberdeen	1858
	Campbell, Thomas, Croftness, Aberfeldy	1860
	Campbell, Thomas Hinton, of Millfield, Polmont	1864
	Campbell, T. W., of Walton Park, Dalbeattie	1856
	Campbell, Colonel Walter, N.B. Staff, Glasgow	1836
	Campbell, William, of Ormsary, Ardrishaig	1839

		Admitted
600	Campbell, William, Hamilton	1858
	Campbell, W., Cladville, Islay	1861
	Cant, James, Orr Bridge, Kirkcaldy	1863
	Cantlie, William, Keithmore, Dufftown	1852
	Carfrae, Thomas, Land-Surveyor, Edinburgh	1850
	Carlyle, Thomas Johnston, of Waterback, Ecclefechan	1845
	Carmichael, Michael Thomson, of Eastend, Lanark	1825
	Carnegie, David, of Stronvar, Lochearnhead	1847
	Carnegie, George R., Edrom-Newton, Ayton	1854
	Carnegie, James, of Edrom-Newton, W.S., Edinburgh	1852
610	Carnegie, John, of Redhall, Fordoun	1836
	Carnegie, William, of Eastertown, Dunlappie, Brechin	1858
	Carnegie, William, junior, Coul, Tannadyce	1858
	Carnegy, John,	1850
	Carnie, C., of Blairhoyle, Thornhill, Stirling	1864
	Carphin, George, Banker, Dunkeld	1861
	Carre, Walter Riddell, of Cavers Carre, Selkirk	1863
	Carruthers, David Alexander, Warmanbie, Annan	1826
	Carruthers, James, of Craig, New Galloway	1860
	Carruthers, John, Kirkhill, Moffat	1854
620	Carruthers, William Francis, of Dormont, Lockerbie	1848
	Carstairs, Drysdale, Merchant, Liverpool	1838
	Carstairs, John, Smeaton, Kirkcaldy	1859
	Carter, Thomas, Allanton, Chirnside	1863
	Carter, Walter, Bank Agent, Ayton	1864
	Carver, John, Kinloch, Meigle	1861
	Cassels, Alexander, W.S., Edinburgh	1848
	Cathcart, Elias, of Auchindrane, Ayr	1819
	Cathcart, R., of Pitcarlie, Auchtermuchty	1857
	Cattanach, Alexander, of Auchintorlie, Paisley	1866
630	Chalmer, Major, Larbert House, Stirling	1852
	Chalmers, Charles, of Monkshill, Aberdeen	1824
	Chalmers, John Inglis, of Aldbar, Brechin	1844
	Chalmers, Thomas, of Longcroft House, Linlithgow	1860
	Chalmers, William, Parkdargue, Forgue	1864
	Chambers, Robert, London	1841
	Chambers, Robert, Junior, Edinburgh	1864
	Chancellor, John G., of Shieldhill, Biggar	1849
	Chandler, Henry, Salford	1857
	Charge, Thomas, of Barton, Richmond, York	1833
640	Cheape, Lieut.-Col. Charles, of Killundine, Morven	1860
	Cheape, G. C., of Strathtyrum, Wellfield, Strathmiglo	1864
	Cheyne, Henry, of Tangwick, W.S., Edinburgh	1838
	Cheyne, Mrs, of Lismore	1857
	Chiene, George Tod, C.A., Edinburgh	1838

		Admitted
	Chirnside, George, Newton House, Chathill	1860
	Chisholm, Duncan, Popachy, Inverness	1865
	Chisholm, The, Erchless Castle, Inverness	1865
	Chisholm, John, Charleston, Inverness	1854
	Chisholm, Lachlan, late of Lochans	1831
650	Chisholm, William, Barnyards, Inverness	1856
	Chisholme, John Scott, of Stirches, Hawick	1839
	Chivas, Alexander, Banker, Aberdeen	1840
	Chrisp, Thomas, Hawkhill, Alnwick	1853
	Christie, Andrew, Adinston, Tranent	1850
	Christie, Charles J., Westbank, Tranent	1850
	Christie, Charles J., 46, Quality Street, Leith	1862
	Christie, Charles Maitland, of Durie, Leven	1841
	Christie, George, Junior, Shore Road, Stirling	1864
	Christie, James, Edinburgh	1865
660	Christie, Captain James, Hillend, Clackmannan	1835
	Christie, Jas. H. R. Stark, of Teasses, Largo	1863
	Christie, John	1846
	Christie, Peter, Mains of Scotscraig, Tayport	1861
	Christie, Robert, Accountant, Edinburgh	1824
	Christie, Thomas Craig, of Bedlay, Moodiesburn	1857
	Christison, R., M.D., Professor of Materia Medica, University of Edinburgh	1848
	Chrystie, Captain Alexander	1834
	Chrystie, Captain Thomas, R.N., Edinburgh	1841
	Church, D. M., Ferniebank, Liberton	1855
670	Church, James, Tower of Sark, Canonbie	1838
	Church, Miss Margaret, Park House, Canonbie	1860
	Clapperton, James, Caddenlea, Galashiels	1859
	Clapperton, John, Newlands, Gifford	1855
	Clapperton, John, Home Lodge, Edinburgh	1864
	Clark, Archibald, Inverchapple, Kilmun	1853
	Clark, Francis William, of Ulva, Aros	1838
	Clark, James, Wormiston, Crail	1842
	Clark, James, Ardtaraig, Dunoon	1853
	Clark, James, of Crossbasket, Glasgow	1857
680	Clark, James, Oldhamstock Mains, Cockburnspath	1834
	Clark, John, Balycoman, Dunfermline	1851
	Clark, John, Flender, Busby	1857
	Clark, John Gilchrist, of Speddoch, Dabton, Thornhill	1858
	Clark, Maxwell, of Little Culmain, Dumfries	1862
	Clark, Samuel, Manswrae, Kilbarchan	1852
	Clark, William,	1857
	Clarke, Alexander, Eriboll, Lairg	1847
	Clarke, Alexander M., Meddat, Parkhill	1865

		Admitted
	Clarke, Augustus T., of Achareidh, Nairn	1865
690	Clarke, George, Stronchrubie, Assynt	1855
	Clason, Rev. Patrick, D.D., Edinburgh	1838
	Clay, John, Winfield, Berwick	1854
	Clay, Patrick, Berwick-on-Tweed	1854
	Clayhills, Alexander, of Invergowrie, Dundee	1838
	Clerk, Duncan, writer, Oban	1860
	Clerk, James, younger of Penicuik	1847
	Climie, William, Paisley	1857
	Clouston, Peter, Glasgow	1850
	Coats, Peter, of Woodside, Paisley	1852
700	Coats, Thomas, of Ferguslie, Paisley	1852
	Cobb, William, Mains of Fintray, Dundee	1843
	Cochrane, Alexander, of Ashkirk, Hawick	1861
	Cochrane, Alexander Baillie, of Lamington, M.P.	1842
	Cochrane, Henry, Edinburgh	1854
	Cochrane, James, of Harburn, West Calder	1849
	Cochrane, James, Little Haddo, Foveran	1858
	Cochrane, William, Greenlaw Cottage, Roslin	1848
	Cockburn, George, Kilchiaron, Islay	1861
	Cockburn, Archd. D., Edinburgh	1866
710	Cogan, Robert, Merchant, Glasgow	1830
	Cole, Captain William W., London	1848
	Colledge, William, Haggs Castle, Pollockshaws	1850
	Collie, John, Elgin	1853
	Collier, John, Panlathie, Carnoustie	1843
	Collyer, William D., of Cormiston, Biggar	1857
	Colquhoun, A. Campbell, yr. of Killermont, Maryhill	1854
	Colquhoun, John, Corkerhill, Pollockshaws	1850
	Colquhoun, John Campbell, of Killermont, Maryhill	1824
	Colvin, William, of Craigielands, Moffat	1860
720	Condie, George, Writer, Perth	1852
	Condie, James, Blackfriar's House, Perth	1839
	Congreve, John, of Flichity, Inverness	1865
	Connell, James, of Conheath, Irvine House, Langholm	1843
	Conning, John, Solicitor, Perth	1852
	Constable, George, of Soylziary, Blairgowrie	1852
	Constable, James C., of Callie, Blairgowrie	1854
	Constable, James, Seaside, Errol	1860
	Constable, Rev. John, Principal of the Royal Agricultural College, Cirencester	1864
	Cook, Alex. Shank, Advocate, Sheriff of Ross-shire	1859
730	Cook, Charles, Aboyne Arms Inn, Aboyne	1858
	Cook, John, W.S., Edinburgh	1841

		Admitted
	Cooper, Alexander, Writer, Elgin	1865
	Cooper, Henry R., of Ballindalloch, Balfron	1845
	Cooper, James, Chapelton, Methlic, Ellon	1858
	Cooper, William, of Failford, Tarbolton	1845
	Copland, Robert, Mill of Airdlethen, Ellon	1855
	Copland, John, Mainshead, Maxwelltown	1864
	Copland, Samuel, 38, Mornington Crescent, London	1866
	Copland, Walter, Thirlestane, Selkirk	1863
740	Cordiner, William F., Fraserford, Dunscore	1840
	Corrie, Adam, South Park, Borgue, Kirkcudbright	1860
	Cossar, Robert, Chesterhall, Dunbar	1859
	Cotesworth, Robert, of Cowdenknowes, Melrose	1864
	Coubrough, Archibald, Biggarshields, Biggar	1857
	Coubrough, James, Blairtummoch, Campsie	1852
	Coupar, John, Balrownie, Brechin	1859
	Cousin, George, Sunnyside, Edinburgh	1865
	Cousland, James, Banker, Denny	1864
	Coutts, William, Sandlaw, Banff	1858
750	Coventry, Andrew, of Pitilloch, Edinburgh	1844
	Coventry, George Andrew, yr. of Shanwell	1852
	Coventry, William, Pleasance, Aberdour	1864
	Cowan, Alexander, Liverpool	1865
	Cowan, Andrew, Spittalhill, Fintry	1857
	Cowan, Charles, of Logan House, Penicuik	1836
	Cowan, Charles W., yr. of Logan House, Penicuik	1860
	Cowan, David, Edinburgh	1844
	Cowan, James, of Dildawn, LL.D., Castle-Douglas	1852
	Cowan, John, of Beeslack, Milton Bridge	1858
760	Cowan, Peter, Lurg, Fintry	1857
	Cowan, Richard	1854
	Cowan, Robert, W.S., Edinburgh	1861
	Cowan, Robert, Park Mains, Paisley	1862
	Cowie, Alexander, Crombly Bank, Ellon	1853
	Cowie, David, Dysart, Montrose	1851
	Cowie, James, Sundredge Hall, Bromley, Kent	1852
	Cowper, James, Achorachan, Ballindalloch	1860
	Craib, John, Strathmore, Tarland	1858
	Craig, David, Papermaker, Portobello	1855
770	Craig, James, Caledonian Distillery, Edinburgh	1850
	Craig, James, of Craigdarroch, New Cumnock	1857
	Craig, James H. Gibson, yr. of Riccarton, Hermiston	1863
	Craig, John, Guelt, Old Cumnock	1857
	Craig, John, Littlehill, Bishopbriggs	1857
	Craig, Joseph, of Threecrofts, Lochrutton	1860
	Craig, Robert, Buckley, Bishopriggs	1857

		Admitted
	Craig, William, Writer, Dumfries	1859
	Craig, William C., Anneston, Biggar	1855
	Craig, William, Craig Villa, New Cumnock	1862
780	Craigie, James, Easter Tarsappie, Perth	1861
	Craigie, William Roper, Toman Droighne, Ballinluig	1858
	Craike, Charles, Esbie, Lochmaben	1863
	Cranstan, James, Pathhead, Cockburnspath	1857
	Cranstoun, George Cranstoun Trotter, of Dewar, Ayton	1849
	Cranstoun, William S., Dyke, Moffat	1859
	Craufurd, W. Houison, of Craufurdland, Kilmarnock	1809
	Crauford, Adam, Edinburgh	1850
	Crauford, Alexander, Writer, Dunse	1853
	Crawford, Charles	1822
790	Crawford, Daniel, Barnbeath, Kilbarchan	1860
	Crawford, James Coutts, of Overton, Strathaven	1855
	Crawford, John, of Auchinames, West Kilbride	1818
	Crawford, John, The House of Tongue, Lairg	1854
	Crawford, John, Millstoneford, West Kilbride	1865
	Crawford, Peter, Drumjoyack, Strathblane	1857
	Crawford, William, late of Doonside, Ayr	1836
	Crawford, William, Balgarvie, Perth	1860
	Crawfurd, John	1819
	Crawford, Muir, Leith	1867
800	Crawford, Robert, Balbougie, Inverkeithing	1866
	Crafurd, W. S. Stirling, of Milton, Glasgow	1838
	Crease, William, Edinburgh	1866
	Crerar, John, Easter Drumatherty, Dunkeld	1861
	Creyk, Dr Alexander, Pitchaish, Ballindalloch	1850
	Crichton, Hew, Edinburgh	1838
	Crichton, Hew Hamilton, W.S., Edinburgh	1849
	Crichton, James Arthur, Advocate, Edinburgh	1847
	Crichton, John, of Linn, Dalry, Ayr	1849
	Crichton, William, Live Stock Agent, Haddington	1859
810	Croall, John, Middlefield House, Edinburgh	1849
	Crombie, Alexander, of Thornton, Laurencekirk	1835
	Crombie, Alexander, yr. of Thornton, W.S., Edin.	1858
	Crombie, John, Edinburgh	1861
	Cromarty, Wm., St. Margaret's Hope, Orkney	1857
	Cross, David, Seed Merchant, Glasgow	1845
	Cross, Robert, Hilltown, Liberton	1852
	Crossman, M. G., Corn Merchant, Berwick	1865
	Cruickshank, Amos, Sittyton, Aberdeen	1858
	Cruickshank, Anthony, Aberdeen	1847
820	Cruickshank, George, Comisty, Huntly	1852
	Cruickshank, John, Barmuckitry, Elgin	1854

		Admitted
	Cruikshank, John, Elgin	1852
	Cruickshank, John B., Newton, Kinloss, Forres	1858
	Cruickshank, William, Milton of Brachlick, Ardersier	1865
	Crum, Alexander, Caplerig, Newton Mearns	1865
	Crum, Walter, of Thornliebank, Glasgow	1844
	Cumming, Henry Gordon, Pittyvaich, Dufftown	1865
	Cumming, Robt. Crawford, of Barremman, Roseneath	1857
	Cuninghame, David, Chapelton, Ardrossan	1850
830	Cunliff, Richard Stedman, Glasgow	1857
	Cunningham, Alexander, of Balgownie, Culross	1841
	Cunningham, Alexander, Morebattle Tofts, Kelso	1841
	Cunningham, Alexander G., Rosebank, Currie	1854
	Cunningham, Andrew, Carlogie House, Carnoustie	1861
	Cunningham, Charles R., Grahamslaw, Kelso	1863
	Cunningham, James, Tarbreoch, Dalbeattie	1864
	Cunningham, J. Barry, of Hensol, Castle-Douglas	1866
	Cunningham, James C., Edinburgh	1864
	Cunningham, John Sinclair, Seed Merchant, Edin.	1852
840	Cunningham, John, Whitecairn, Dalbeattie	1857
	Cunningham, John M., Solicitor, Stirling	1864
	Cunningham, Thomas, Dallachy, Aberdour	1851
	Cunningham, Thomas, Kirkettle, Roslin	1857
	Cunningham, William A., of Logan, Cumnock	1836
	Cunningham, Wm., Hole, Lennoxtown	1857
	Cunningham, W. C. S., of Caprington, Kilmarnock	1859
	Currie, Alexander, Advocate, P.C.S., Edinburgh	1836
	Currie, Andrew, Merchant, Kirkcaldy	1859
	Currie, James, Halkerston, Gorebridge	1853
850	Currie, William, of Linthill, Lilliesleaf	1863
	Curror, Adam, Myreside, Edinburgh	1849
	Curror, David, of Wester Craigduckie, Edinburgh	1867
	Curror, John, Comiston, Lothian Burn	1848
	Curror, Robert, Stirling	1859
	Cuthbertson, Archibald, Greendykes, Tranent	1822
	Cuthbertson, William, Merchant, Glasgow	1836

	†DALKEITH, The Right Hon. William, Earl of, M.P.	1853
	†DALHOUSIE, The Right Hon. Fox, Earl of, K.T.	1831
	DUNMORE, The Right Hon. Charles, Earl of	1862
860	DUDLEY, The Right Hon. William, Earl of	1843
	DUNFERMLINE, The Right Hon. Ralph, Lord, K.C.B.	1859
	DUNGLASS, The Right Hon. Charles, Lord	1860
	DRUMMOND, The Hon Francis	1861

		Admitted
	DUFF, The Hon. George Skene	1866
	DEAS, The Hon. Lord	1838
	DUNBAR, Sir William, of Mochrum, Bart.	1845
	DALRYMPLE, Sir Hew, of North Berwick, Bart.	1841
	DALRYMPLE, The Hon. George Grey, St. Boswell's	1865
	DALYELL, Sir Robert A. O., of Binns, Bart.	1866
870	DUNBAR, Sir Archibald, of Northfield, Bart.	1839
	DUNBAR, Sir George, of Hempriggs, Bart.	1839
	DOUGLAS, Sir George H. S., of Springwood Park, Bart.	1851
	DUNDAS, Sir David, of Dunira, Bart.	1828
	DAVIE, Sir Henry R. Ferguson, of Creedy, Bart., M.P.	1848
	Dale, John R., Auldhame, North Berwick	1851
	Dalgairns, Lieut.-Col., Balgersho, Coupar-Angus	1841
	Dalgleish, Archibald, Glenmore, Oban	1854
	Dalgleish, James Ogilvie, of Woodburne, Ceres	1857
	Dalgleish, James, of Ardnamurchan, Edinburgh	1857
880	Dalgleish, John J., yr. of Ardnamurchan, Edinburgh	1857
	Dalgleish, Laurence, Ardnamurchan, Mull	1858
	Dalgleish, Robert Bayne, of Dura, Cupar-Fife	1848
	Dalglish, Robert, of Kilmardinny, M.P., Glasgow	1857
	Dalmahoy, Patrick, of Bowerhouse, W.S., Edinburgh	1862
	Dalrymple, Charles, of Hailes, Musselburgh	1862
	Dalrymple, James, of Woodhead, Kirkintilloch	1857
	Dalrymple, James, of Langlee, Galashiels	1859
	Dalzell, Allen, M.D., Edinburgh	1857
	Dalzell, James Allen, North Berwick	1835
890	Dalziel, Alexander, Glenwharrie, Sanquhar	1860
	Dalziel, George, Merkland, Thornhill	1860
	Darling, Adam, Berwick	1857
	Darling, James Stormonth, of Lednathie, W.S.	1863
	Darling, Thomas, Mordington Mains, Berwick	1863
	Darling, William, Prestlaw, Haddington	1839
	Darroch, Duncan, of Gourock, Greenock	1865
	Davidson, Adam, Nairn	1855
	Davidson, Alex., Mains of Cairnbrogie, Old Meldrum	1855
	Davidson, Duncan, of Tulloch, Dingwall	1824
900	Davidson, Duncan H.C.R., yr. of Tulloch, Dingwall	1864
	Davidson, George, Dean Park, Balerno	1847
	Davidson, Geo., Buxburn Mills, Auchmill, Aberdeen	1858
	Davidson, George, Walton, Linlithgow	1860
	Davidson, Henry, of Muirhouse, Edinburgh	1848
	Davidson, Henry M., Sheriff-Clerk of Haddingtonshire	1841
	Davidson, Hugh, The Customs, Wick	1839
	Davidson, John, Brathins, Banchory	1857
	Davidson, John, Land Steward, Crathes, Aberdeen	1864

		Admitted
	Davidson, Lawrence, W.S., Edinburgh	1829
910	Davidson, Patrick, of Inchmarlo, Aberdeen	1834
	Davidson, Robert, Banker, Inverness	1865
	Davidson, William James, of Ruchill, Glasgow	1850
	Davidson, W. G., of South Fod, Dunfermline	1866
	Dawson, John, Swinton Bridge End, Coldstream	1859
	Dawson, Rev. Thos. H., Monymusk	1858
	Dawson, Wm., Magdalen Distillery, Linlithgow	1857
	Dawson, William, Warriston, Hermiston	1864
	Dean, John, Mains of Balquhain, Keith Hall	1856
	Deans, Henry, East Fenton, Drem	1850
920	Deans, James Young, of Kirkstyle, Kilmarnock	1857
	Deans, John, Hedderwick, Dunbar	1841
	Deans, Peter D., Edinburgh	1850
	Dempster, George, late of Skibo	1823
	Dempster, George H., of Dunnichen, Forfar	1857
	Denholm, Alexander, Baitlaws, Biggar	1854
	Denholm, David, Carberry, Musselburgh	1854
	Dennistoun, Alexander H., Lagarie, Helensburgh	1850
	Dennistoun, John, Helensburgh	1838
	Dennistoun, Richard, Liverpool	1855
930	Denoon, David, Merchant, London	1839
	Dewar, Lt.-Col. Alex. C., Strathgarry, Blair-Athole	1832
	Dewar, Andrew, Arnprior, Kippen, Stirling	1864
	Dewar, Daniel, Isle of Man	1860
	Dewar, Gilbert Innes, Edinburgh	1860
	Dewar, James, of Vogrie, Ford	1842
	Dewar, John, Wine Merchant, Perth	1861
	Dewar, Peter, King's Park, Stirling	1864
	Dewhurst, George C., of Aberuchill, Comrie	1864
	Dick, Dr. John, Broombank, Mid-Calder	1856
940	Dick, John, of Muirhead, Writer, Stirling	1864
	Dick, William Douglas, of Montrave, Kennoway	1828
	Dickenson, William, Longcroft, Lauder	1859
	Dickie, John, Seedsman, Kilmarnock	1857
	Dickson, Alexander, Hermiston, Edinburgh	1848
	Dickson, Archibald, Bughtrig, Coldstream	1854
	Dickson, Archibald, of Huntlaw	1823
	Dickson, George, of Huntlaw	1830
	Dickson, James, Dyemill, Moffat	1859
	Dickson, James Jobson, C.A., Edinburgh	1850
950	Dickson, James Anderson, Banker, Arbroath	1858
	Dickson, John, Saughton Mains, Edinburgh	1844
	Dickson, John Heatly, Saughton Mains, Edinburgh	1862
	Dickson, John, W.S., Perth	1846

		Admitted
	Dickson, John F., Panbride House, Carnoustie	1858
	Dickson, Peter, London	1858
	Dickson, Thomas, of Crochmore, Durrisdeer	1860
	Dingwall, Walter, Edinburgh	1849
	Dingwall, William, Ramornie. Ladybank	1851
	Dinning, John, Belford	1863
960	Dirom, Capt. Thos. Pasley, of Mount Annan, Annan	1860
	Dixon. Thomas G., Rhyl	1849
	Dobie, David, Tinwald Parks, Dumfries	1862
	Dobie, John, Campend, Dalkeith	1866
	Dodd, Nicholas, Nisbet, Kelso	1863
	Dodd, James, Mossburnford, Jedburgh	1863
	Dodd, William, Merchant, Glasgow	1837
	Doddrell, George J., Glasgow	1857
	Dodds, James, Factor, Leslie House, Markinch	1865
	Dodds, John Cranston Riddell, Dalkeith	1844
970	Dods, William, Seed Merchant, Haddington	1850
	Dods, William, Elwartlaw, Greenlaw	1863
	Don, Alexander, Keirsbeath, Crossgates,	1858
	Donald, James, Waulkmill, Midmar	1858
	Donald, James, Pitalpine Works, Lochee, Dundee	1865
	Donald, William, Australia	1857
	Donaldson, James, of Keppoch, Cardross	1845
	Dougal, John, of Glenferness, Nairn	1844
	Dougall, Adam, Stewarton, Kirkinner	1865
	Dougall, Andrew, Railway Manager, Inverness	1865
980	Dougall, Capt. Maitland, of Scotscraig, Tayport	1857
	Douglas, Alexander Forbes, Mount Teviot, Jedburgh	1854
	Douglas, Bentlem, Cairntows, Liberton	1858
	Douglas, Francis Brown, Advocate, Edinburgh	1839
	Douglas, George, Riddletonhill, Maxton	1861
	Douglas, James, Athelstaneford, Drem	1848
	Douglas, James, of Cavers, Hawick	1863
	Douglas, John, Tinnis, Selkirk	1862
	Douglas, E. O., of Killiechassie, Aberfeldy	1866
	Douglas, Ronald, Conon, Dingwall	1864
990	Douglas, Thomas, Clyth, Lybster	1861
	Douie, Andrew, Blair-Adam	1851
	Douie, John R. S., Factor, Polmaise, Stirling	1864
	Dove, John, Eccles Newtown. Coldstream	1853
	Dowell, Alexander, Edinburgh	1858
	Downie, John, Merchant, Glasgow	1838
	Downie, Wm., Mains of Linton, Cluny, Aberdeen	1867
	Drennan, James, Holmston, Ayr	1857
	Drew, Laurence, Merryton, Hamilton	1850

		Admitted
	Drife, James, New Zealand	1857
1000	Drimmie, Daniel, Panmure Bleachfield, Dundee	1843
	Dron, William, Crieffvechter, Crieff	1861
	Drummond, George Home, yr. of Blair-Drummond	1835
	Drummond, Henry Home, of Blair-Drummond	1809
	Drummond, Henry, Seedsman, Stirling	1859
	Drummond, John, of Balquhandy, Dunning	1864
	Drummond, John Murray, of Megginch, Errol	1852
	Drummond, Thomas, of Newton	1828
	Drummond, William, Banker, Cupar-Fife	1837
	Drybrough, Thomas, Brewer, Edinburgh	1858
1010	Dryden, W., Land-Steward, Springwood Park, Kelso	1863
	Drysdale, Andrew, Myreton, Menstrie	1858
	Drysdale, Henry, Mains of Aberdalgie, Perth	1864
	Drysdale, William, yr. of Kilrie, Kinghorn	1861
	Dudgeon, James, Fodderty, Dingwall	1850
	Dudgeon, John, of Pearcelands, Sussex	1840
	Dudgeon, J. S., The Rocks, West Hoathly, Sussex	1862
	Dudgeon, John, Almondhill, Kirkliston	1847
	Dudgeon, John B., Crakaig, Golspie	1856
	Dudgeon, Patrick, of Cargen, Dumfries	1851
1020	Dudgeon, Robert, Humbie, Winchburgh	1849
	Duff, Rev. David, D.D., Minister of Kenmore	1839
	Duff, James, Melgund, Aberlemno, Forfar	1865
	Duff, Lauchlan Duff Gordon, of Drummuir	1858
	Duff, Thomas, Edinburgh	1861
	Duff, Robert W., of Fetteresso, M.P., Stonehaven	1866
	Duff, Captain Wharton, of Orton, Fochabers	1864
	Duguid, Peter, of Cammachmore, Aberdeen	1858
	Dun, John, of Gilston, Galashiels	1863
	Duncan, Alexander, of Providence, Rhode Island	1851
1030	Duncan, Alexander, Leuchars Castle, Leuchars	1857
	Duncan, Alexander, of Glencarron, Denny	1864
	Duncan, David H., Friock Mains, Arbroath	1858
	Duncan, George, Dundee	1843
	Duncan, James, Merchant, Leith	1826
	Duncan, John, Newseat of Tolquhon, Tarves	1855
	Duncan, John, Ardo, Methlie	1858
	Duncan, Robert, Kirkmay, Crail	1855
	Duncan, William, S.S.C., Edinburgh	1848
	Dundas, George, Advocate, Sheriff of Selkirkshire	1846
1040	Dundas, Joseph, of Carron Hall, Falkirk	1862
	Dundas, Robert, of Arniston, Gorebridge	1847
	Dunlop, Alex. Murray, of Corsock, M.P., Edin.	1828
	Dunlop, Alexander, Glasgow	1857

		Admitted
	Dunlop, George, Edinburgh	1849
	Dunlop, Henry, of Craigton, Glasgow	1838
	Dunlop, James, of Doonside, Largs	1844
	Dunlop, James, of Arthurlee, Barrhead	1844
	Dunlop, John, Duddingston, Edinburgh	1836
	Dunlop, John, Whiteshawgate, Strathaven	1857
1050	Dunlop, John, Clermiston, Corstorphine	1859
	Dunlop, William H., of Annanhill, Kilmarnock	1853
	Dunn, Adam, Tranent Mains, Tranent	1854
	Dunn, Alexander, Wester Leochel, Craigievar	1858
	Dunn, David, Berryhill, Kelso	1863
	Dunn, John, Wester Innenteer, Craigievar	1858
	Dunn, William, Roxburgh Mains, Kelso	1853
	Durie, David, Nether Mill, Fettercairn	1858
	Durie, Robert Hogg, Barney Mains, Haddington	1855
	Duthie, Alexander, Edinburgh	1847
1060	Dyson, Thos. C., of Willowfield, Halifax, Yorkshire	1832
	ESTHERHAZY, His Highness the Prince, Hungary, Honorary Associate	1836
	ERROL, The Right Hon. William, Earl of	1854
	EGLINTON and WINTON, The Right Hon. Archibald, Earl of	1863
	ELCHO, The Right Hon. Francis, Lord, M.P.	1847
	ELIBANK, The Right Hon. William, Lord	1836
	ELPHINSTONE, The Right Hon. Alexander, Lord	1860
	EDMONSTONE, Sir Archibald, of Duntreath, Bart.	1821
	ELPHINSTONE, Sir James Dalrymple Horn, of Horn and Logie-Elphinstone, Bart.	1840
	ERSKINE, Sir Thomas of Cambo, Bart., Crail	1860
1070	ELLIOT, Sir Walter, of Wolfelee, K.S.I., Hawick	1866
	Easson, Robert, Errol Cottage, Errol	1860
	Eden, The Right Rev. Bishop, Hedgefield House, Inverness	1865
	Eddison, Edwin, Headingly Hill, Leeds	1850
	Edgely, Thomas, Gilmerton, Edinburgh	1857
	Edington, Peter, Land Steward, Drummond Castle	1864
	Edmiston, Hugh Fleming, Yoker Mains, Glasgow	1863
	Edmond, John, Croftamie, Drymen	1857
	Edmonds, Leonard, London	1858
	Edward, Allan, Merchant, Dundee	1843
1080	Edwards, Matthew, Hilton, Alloa	1859
	Edwards, Dr. James, Beechfield, Craigellachie	1865
	Elder, George, of Knock Castle, Wemyss Bay	1863

		Admitted
	Elder, James, late, Whitehill Mains, Silverton	1854
	Elder, James, East Bearford, Haddington	1866
	Elder, Thomas, Amisfield Mains, Haddington	1854
	Ellice, Edward, of Glenquoich, M.P.	1836
	Elliot, Adam, M.D., Goldielands, Hawick	1852
	Elliot, Henry, Junior, Greenriver, Hawick	1863
	Elliot, James, Lamberton, Berwick	1854
1090	Elliot, James, Galalaw, Kelso	1853
	Elliot, John, Primrosehill, Dunse	1854
	Elliot, John, of Binks, Burnmonth, Newcastleton	1863
	Elliot, John, The Flatt, Newcastleton	1863
	Elliot, Robert, Laighwood, Dunkeld	1848
	Elliot, Robert Kerr, of Clifton, Kelso	1849
	Elliot, Thomas, Hindhope, Jedburgh	1852
	Elliot, Thomas, Blackhall, Galashiels	1854
	Elliot, Walter, Hollybush, Galashiels	1860
	Elliot, Thomas, Knockdon, Maybole	1867
1100	Elliot, Walter, Hermitage, Newcastleton	1866
	Elphinstone, Lieutenant-Colonel John	1827
	Embleton, John, Broomhouse, Berwick-on-Tweed	1854
	Errington, Rowland, of Sandhoe, Northumberland	1841
	Erskine, Henry David, of Cardross, Stirling	1862
	Erskine, Vice-Admiral John E., M.P., London	1859
	Erskine, James, of Shielfield, Melrose	1849
	Erskine, Thomas, of Linlathen, Broughty Ferry	1843
	Euing, William, Glasgow	1857
	Ewen, Robert, Westown, Tarland	1858
1110	Ewing, Alexander, Glasgow	1844
	Ewing, Alexander, Crum, yr. of Strathleven	1857
	Ewing, Arch. Orr, of Ballikinrain, Killearn	1851
	Ewing, Humphrey Ewing Crum, of Strathleven, M.P.	1857
	Ewing, James Lindsay, of Caldercruix, Glasgow	1844
	Ewing, John Orr, Glasgow	1838
	†FIFE, The Right Hon. James, Earl of, K.T.	1846
	FORBES, The Right Hon. Walter, Lord	1833
	FORBES, The Hon. Charles M. H., of Brux	1821
	FRASER, Col. The Hon. Allister E., Elean Agis	1865
1120	FLAHAULT, Charles, Count Mercer de	1821
	FORBES, Sir William, of Craigievar, Bart.	1857
	FERGUSSON, Sir James, of Kilkerran, Bart., M.P.	1854
	FORBES, Sir Charles, of Newe and Edinglassie, Bart.	1828
	Fair, James S. Elliot, of Langlee, Jedburgh	1854

		Admitted
	Fair, John S. Elliot, Gilliestongues, Jedburgh	1863
	Fairholme, Geo. K. Erskine, of Old Melrose, Melrose	1864
	Fairholme, William, of Chapel-on-Leader, Lauder	1861
	Fairlie, James Ogilvie, of Coodham, Kilmarnock	1837
	Fairlie, James, Tanfield, Edinburgh	1865
1130	Fairrie, John, Merchant, London	1831
	Fairweather, Robert	1855
	Falconar, George, St. Andrews	1835
	Falconar, John, Arnbarrow, Fettercairn	1858
	Falconer, Donald, Connonsyth, Arbroath	1858
	Falconer, Peter, Disblair, Summerhill, Aberdeen	1851
	Falconer, Thomas, Kinermony, Craigellachie	1865
	Falshaw, James, Civil Engineer, Edinburgh	1849
	Farie, James, of Farme, Glasgow	1850
	Farish, Samuel, Kirklands, Lockerbie	1860
1140	Farquhar, Arthur, of Elsick, W.S., Stonehaven	1852
	Farquharson, Francis, of Finzean, Edinburgh	1850
	Farquharson, James Ross, of Invercauld, Braemar	1865
	Farquharson, John, New Market, Aberdeen	1865
	Farquharson, Major-General Francis	1843
	Farquharson, Francis, Builder, Haddington	1856
	Farquharson, James, Auchinblae	1852
	Farquharson, Major John, of Corrachrie, Tarland	1841
	Farquharson, Robert O., of Haughton, Alford	1857
	Farrell, Alfred Herbert William	1858
1150	Farrell, Michael, of Woodburnden, Fordoun	1857
	Fender, Robert, Rules Mains, Dunse	1863
	Fenton, John, Mill of Mains, Dundee	1843
	Fenwick, John, North House, Hawick	1862
	Ferguson, Vice-Admiral George, of Pitfour, Mintlaw	1828
	Ferguson, James D., Richmond, Yorkshire	1852
	Ferguson, John, of Knockindale	1824
	Ferguson, John, Burghlee, Loanhead	1863
	Ferguson, John, East Grange, Forres	1855
	Ferguson, John, Brae of Coynach, Mintlaw	1860
1160	Ferguson, John, of Kilquhanity, Dalbeattie	1846
	Ferguson, Lieut.-Colonel Robert Munro, of Raith	1845
	Ferguson, Thomas, Kinnochtry, Cupar-Angus	1858
	Ferguson, William, Auchenhard, West Calder	1864
	Fergusson, Muir, of Middlehaugh, Pitlochry	1842
	Fergusson, Samuel R., London	1836
	Fernie, John Carmichael	1853
	Fettes, James, Surgeon, Laurencekirk	1850
	Field, The Rev. Edward Burch, of Moreland, Kinross	1864
	Field, James Hamilton, yr. of Moreland, Kinross	1864

		Admitted
1170	Findlay, Major, of Baturrich, Dumbarton	1857
	Findlay, Robert, Springhill, Bailieston, Glasgow	1855
	Findlay, Thomas Dunlop, Easterhill, Glasgow	1847
	Finlay, Alex. S., of Castle Toward, M.P., Dunoon	1844
	Finlay, John, New Farm, Lochgelly	1859
	Finlay, William, Brackenbrae, Bishopbriggs	1857
	Finlayson, James, Prora, Drem	1859
	Finlayson, John, Factor, Lochalsh	1859
	Finlayson, William, Harperstone, Dunblane	1864
	Finnie, Archibald, Springhill, Kilmarnock	1865
1180	Finnie, James, of Newfield, Dundonald	1853
	Fisher, Donald, Pitlochrie	1861
	Fisher, James, M.D.	1821
	Fleming, Alexander, Rousland, Linlithgow	1864
	Fleming, Andrew, Mains of Fullwood, Paisley	1852
	Fleming, James, Coats, Penicuik	1857
	Fleming, James, Holm, Stonehouse	1857
	Fleming, James, Three-Mile-Town, Linlithgow	1854
	Fleming, James, Kinneil Mills, Linlithgow	1864
	Fleming, J. N., Kilkerran, Maybole	1864
1190	Fleming, John, Ballindalloch	1857
	Fleming, John, Hawkwood, Strathaven	1857
	Fleming, John, 26, Queen's Gate, London	1865
	Fletcher, Angus, of Dunans, Edinburgh	1826
	Fletcher, Archibald, Tyndrum	1857
	Fletcher, Major C. E.	1848
	Fletcher, Don., of Bernice, Altamore, Tighnabruaich	1857
	Fletcher, Dugald. Ballachindrain, Cairndow	1853
	Fletcher, James, of Rosehaugh, Munlochy	1865
	Fletcher, John, yr. of Salton, Haddington	1857
1200	Flockhart, John, Charleton, Colinsburgh	1861
	Flockhart, William, Flockhouse, Blair Adam	1861
	Foggo, Robert Gordon, Rothiemurchus, Aviemore	1865
	Forbes, Arthur, of Culloden, Inverness	1850
	Forbes, Charles Henry, of Kingairloch, Bonaw	1836
	Forbes, Charles William	1856
	Forbes, Dugald, Writer, Glasgow	1847
	Forbes, George, Merchant, London	1830
	Forbes, Duncan, Culloden, Inverness	1865
	Forbes, George, Parkhead Villa, Perth	1835
1210	Forbes, James D., D.C.L., Principal of St. Andrews	1836
	Forbes, James Stewart, Edinglassie, Strathdon	1830
	Forbes, James Ochoncar, of Corse, Whitehouse	1862
	Forbes, Major John, of Invereman, C.B., Strathdon	1842
	Forbes, John, of Haddo, Forgue	1850

		Admitted
	Forbes, John, Ironmonger, Inverness	1865
	Forbes, Patrick, of St Catherine's, Edinburgh	1834
	Forbes, William, of Medwyn, Edinburgh	1835
	Forbes, William, of Callendar, Falkirk	1860
	Forbes, William, Auchindinny, Milton Bridge	1863
1220	Ford, William, Hardengreen, Dalkeith	1849
	Forlong, William, of Erins, Tarbert	1838
	Forman, John Nairne, W.S., Edinburgh	1831
	Forman, John, Duncra Hill, Tranent	1863
	Forman, Robert, Keith House, Dalkeith	1852
	Forrest, David, of Treesbanks, Shotts	1857
	Forrest, James, junior, Kirriemuir	1843
	Forrest, Peter, Haggs, Ratho	1863
	Forrest, William, Allanton, Hamilton	1863
	Forrester, John, W.S., Edinburgh	1842
1230	Forrester, William, Edinburgh	1851
	Forsyth, David, Writer, Elgin	1865
	Forsyth, George, Ashybank, Hawick	1863
	Forsyth, John, Arabella, Parkhill, Tain	1855
	Fortune, George, Barnsmuir, Crail	1857
	Fortune, William R., of Muircambus, Colinsburgh	1854
	Foulis, Robert, M.D., Cairnie Lodge, Cupar-Fife	1861
	Fowler, Henry Mackenzie, of Raddery, Fortrose	1846
	Fox, Michael, junior	1849
	Fox, Richard M., of Foxhall, Rathowen, Ireland	1838
1240	Foyer, David, Knowehead, Campsie	1857
	France, Robert, Logie Cottage, Stirling	1867
	Fraser, Colonel Alexander, Royal Engineers	1818
	Fraser, Alexander, Faillie, Inverness	1857
	Fraser, Andrew, W.S., Sheriff-Sub., Fort-William	1840
	Fraser, Archd. Thos. Fred., of Abertarff, Inverness	1820
	Fraser, Colonel Charles, of Castle Fraser, Cluny	1816
	Fraser, Evan Baillie, Inverness	1840
	Fraser, Hugh, Abersky, Inverness	1840
	Fraser, Hugh, Balloch of Culloden, Inverness	1853
1250	Fraser, Hugh, Calcutta	1856
	Fraser, John, London	1840
	Fraser, John, of Bunchrew, Inverness	1856
	Fraser, John, East Pinkerton, Dunbar	1860
	Fraser, Capt. Jn., of Balnain, Farraline, Inverness	1865
	Fraser, Patrick Allan, of Hospitalfield, Arbroath	1854
	Fraser, Patrick, Sheriff of Renfrewshire	1863
	Fraser, Robert, Brackla, Nairn	1839
	Fraser, Simon, Craignish Castle, Lochgilphead	1867
	Fraser, Sweton, Auchernack, Grantown	1854

		Admitted
1260	Fraser, Rear-Admiral Thomas, Portobello	1817
	Fraser, William, W.S., Edinburgh	1837
	Fraser, William Sutherland, Banker, Dornoch	1850
	Fraser, William, Kilmuir, Skye	1852
	Fraser, William, Peel, Tibbermuir	1861
	Fraser, William, Upper Lairg, Inverness	1865
	Frazer, John, Overton, New Abbey, Dumfries	1858
	Frederick, David, Drumbreddon, Stranraer	1857
	Freeland, Robert, of Gryffe Castle, Bridge of Weir	1835
	French, James, Lampits, Carnwath	1855
1270	French, Dr James, C.B., Edinburgh	1853
	Frew, James, Balmalloch, Kilsyth	1858
	Frew, Thomas, Garvell House, Kilsyth	1867
	Friar, Thomas, of Grinden Ridge, Etal	1854
	Fullarton, Gavin, of Kerelaw, Stevenston	1844
	Fullerton, Captain James	1824
	Fulton, Andrew, Saddler, Edinburgh	1857
	Fulton, William, Hatchetnize, Coldstream	1863
	Fyfe, John, of Dalmarnoch, Glasgow	1847
	Fyfe, Robert, junior, Arlary, Kinross	1861
1280	†GALLOWAY, The Right Hon. Randolph, Earl of	1830
	†GLASGOW, The Right Hon. James, Earl of	1822
	GARLIES, The Right Hon. Alan, Viscount	1860
	GRANT, The Hon. James, of Grant, Forres	1865
	GRIERSON, Sir Alex. William, of Rockhall, Bart.	1860
	GRANT, Sir Archibald, of Monymusk, Bart.	1854
	GRANT, Sir G. Macpherson, of Ballindalloch, Bart.	1859
	GLADSTONE, Sir Thomas, of Fasque, Bart.	1834
	GRANT, Lieut.-Gen. Sir Patrick, G.C.B.	1862
	Gair, Hugh A., Hilton, Inverness	1864
1290	Gairdner, Charles Dalrymple, Auchans, Dundonald	1853
	Gairdner, Robert, Banker, Kilmarnock	1858
	Galbraith, Alex., Croy, Cunningham, Killearn	1857
	Galbraith, David Stewart, late of Machrihanish	1812
	Galloch, John, Knockhill, Bridge of Allan	1864
	Galloway, David, Cairnie, Glencarse	1861
	Gamgee, John, Albert Veterinary College, London	1859
	Garden, Archibald, Netherton, Forres	1859
	Garden, William, M.D., Balfluig, Aberdeen	1850
	Garden, William, Braco Park, Fraserburgh	1857
1300	Gardiner, George, Carrington Barns, Lasswade	1857
	Gardiner, James, Lanton, Mid-Calder	1855

		Admitted
	Gardiner, Robert, Lowbank, Auchterarder	1861
	Gardner, Hamilton Gray, W.S.	1844
	Gardner, James, Pharmaceutical Chemist, Edinburgh	1859
	Gardner, John	1844
	Gardner, Peter, Rotearns, Braco, Perthshire	1864
	Gardner, Robert, Traquair Knowe, Peebles	1855
	Gardner, Robert, City of Glasgow Bank, Whitburn	1855
	Gardyne, David, of Finhaven, Forfar	1842
1310	Garland, John, Cairnton, Fordoun	1849
	Garland, Thomas, Ardlethen, Ellon	1851
	Gartshore, John Murray, of Gartshore, Kirkintilloch	1825
	Gartshore, John, Seedsman, Falkirk	1864
	Gatherer, George, Writer, Elgin	1854
	Gaukroger, George, Southfield, Longniddry	1859
	Geddes, James, Orbliston, Fochabers	1843
	Geekie, Alexander, of Baldowrie, Cupar-Angus	1837
	Geekie, Peter, Balboughty, Perth	1837
	Geekie, Peter M., Cortachy, Kirriemuir	1861
1320	Geekie, Robert, of Rosemount, Blairgowrie	1843
	Geils, John Edward, of Dumbuck, Dumbarton	1844
	Gentle, Robert, Dell, Inverness	1840
	Gerard, Archibald, of Rochsoles, Airdrie	1842
	Gibb, David, Bridge of Dye, Banchory-Ternan	1855
	Gibbon, Alexander, of Johnston, Laurencekirk	1834
	Gibbs, B. T. Brandreth, London	1849
	Gibson, Charles, Pitlochry	1861
	Gibson, James, The Shaws, Selkirk	1863
	Gibson, James, Gunsgreen Hill, Eyemouth	1864
1330	Gibson, John, W.S., Edinburgh	1825
	Gibson, John, jun., W.S., Edinburgh	1828
	Gibson, John, Woolmet, Dalkeith	1847
	Gibson, John, Eastfield, Wiston, Biggar	1853
	Gibson, John, Tullochquhairn, Dumfries	1860
	Gibson, Robert, Windydoors, Stow	1859
	Gibson, Thomas, Ferniehirst, Stow	1863
	Gibson, William W., Bonnington House, Edinburgh	1859
	Gilchrist, Dugald, of Ospisdale, Dornoch	1865
	Giles, James, of Kailzie, Peebles	1842
1340	Gilkison, Robert, jun., Glasgow	1848
	Gillanders, F. M., of Newmore, Invergordon	1844
	Gillanders, James F., of Highfield, Beauly	1854
	Gillespie, Alexander, Merchant, London	1836
	Gillespie, David, of Mountquhannie, Cupar-Fife	1841
	Gillespie, James, Craigie, Cramond	1849
	Gillespie, James, Annanbank, Lockerbie	1850

		Admitted
	Gillespie, James, Gateside, Douglas	1860
	Gillespie, John, W.S., Edinburgh	1846
	Gillespie, Robert, Merchant, London	1829
1350	Gillison, Thomas, 3, Dryden Road, Liverpool	1862
	Gillon, Andrew, of Wallhouse, Bathgate	1848
	Gilmour, Allan, of Eaglesham, Glasgow	1849
	Gilmour, John, of Mount Vernon, Row	1863
	Gilmour, Matthew, Town of Inchinnan, Renfrew	1857
	Gilmour, Walter James Little, of Craigmillar	1828
	Gilmour, William M., Shawburn, Hamilton	1863
	Girdwood, Robert, Tanfield, Edinburgh	1855
	Gladstone, Robertson, Merchant, Liverpool	1841
	Gladstone, Thomas Stewart, of Capenoch, Thornhill	1853
1360	Glasgow, Alexander, of Old Court, Cork	1847
	Glassford, James Glassford Gordon, of Dougalston	1861
	Glegg, John, Factor, Milliken House, Johnstone	1857
	Glen, John, Merchant, Edinburgh	1847
	Glen, Robert R., Banker, Linlithgow	1860
	Glen, Robert C., Auchenback, Barrhead	1865
	Glen, Thomas, Thornhill, Johnstone	1853
	Glendinning, George, Hatton Mains, Ratho	1849
	Glendinning, George, Rawfarm, Mid-Calder	1861
	Glendinning, Peter, Dalmeny Park, So. Queensferry	1848
1370	Glendinning, Robert W., Broomdykes, Ayton	1854
	Glennie, Arthur, Fernyflat, Bervie	1851
	Glover, Andrew, Lanrick Castle, Doune	1859
	Glover, Robert, Shandon, Drymen	1857
	Goldie, R. G. M., Springfield, Biggar	1865
	Goodlet, William, Bolshan, Arbroath	1851
	Goodsir, John, Professor of Anatomy, University of Edinburgh	1846
	Gordon, Adam Hay, of Avochie, Edinburgh	1846
	Gordon, Alexander, of Ellon	1808
	Gordon, Alexander, of Newton, Insch	1841
1380	Gordon, Arthur Forbes, of Rayne, Edinburgh	1850
	Gordon, Charles, of Auchleuchries, Peterhead	1832
	Gordon, Christopher, Douganhill, Dalbeattie	1866
	Gordon, Vice-Admiral Charles, Huntly	1835
	Gordon, Charles K. Johnstone, of Craig, K.L.S.	1839
	Gordon, David A., of Culvennan, Castle-Douglas	1860
	Gordon, Edward Stratherne, Solicitor General	1840
	Gordon, George, America	1829
	Gordon, George, Tullochallum, Craigellachie	1860
	Gordon, Harry George, Oriental Bank, London	1855
1390	Gordon, Henry, Sheriff-Clerk, Dumfries	1860

		Admitted
	Gordon, James, of Ivy Bank, Nairn	1813
	Gordon, James, of Manar, Keithhall	1835
	Gordon, Captain James Alex., Ittingston, Huntly	1862
	Gordon, John. of Aikenhead, Cathcart	1838
	Gordon, John, Lettock, Glenlivet	1853
	Gordon, John, of Cluny, Aberdeenshire	1861
	Gordon, John, Uppertown of Towie, Mossat	1858
	Gordon, John Taylor, of Nethermuir, New Deer	1831
	Gordon, Robert Macartney, of Rattra, Kirkcudbright	1846
1400	Gordon, P. H., Coul, Laggan	1863
	Gordon, Thos. Dempster, of Balmaghie, Castle-Douglas	1863
	Gordon, William, Aberdeen	1847
	Gordon, William Cosmo, of Fyvie, Aberdeen	1847
	Gorrie, John, Innerdunning, Dunning	1859
	Gough, William, Wykeham Abbey, York	1866
	Gourlay, Adam, Beaulyhill, Lilliesleaf	1863
	Gow, James, Bankend, Denny	1854
	Gow, John L., Raith, Kirkcaldy	1851
	Gowans, James, Rockville, Edinburgh	1860
1410	Græme, Robert, of Welhall, Hamilton	1853
	Graham, Alexander, of Capilly, Barrhead	1844
	Graham, Alexander	1854
	Graham, Carolus J. Home, Edinburgh	1862
	Graham, George	1817
	Graham, Henry, Auckland, New Zealand	1855
	Graham, Humphrey, W.S., Edinburgh	1819
	Graham, James	1827
	Graham, James, of Fereneze, Barrhead	1843
	Graham, James Maxtone, of Redgorton, Stanley	1848
1420	Graham, James, Parcelstown, Westlinton, Carlisle	1851
	Graham, James, Braidlie, Canonbie	1862
	Graham, James, Southbar, Paisley	1863
	Graham, James, Myothill, Denny	1864
	Graham, John, Pearsie, Kingoldrum	1843
	Graham, John, of Shaw, Lockerbie	1852
	Graham, John Murray, of Murrayshall, Perth	1842
	Graham, Paul, of Drynie, Inverness	1865
	Graham, Robert, Hawick	1860
	Graham, Thomas, of Ballewan, M.D., F.R.S., Master of the Mint, London	1849
1430	Graham, Col. William, of Mossknow, Ecclefechan	1834
	Graham, William, jun., of Finnartmore, Kilmun	1844
	Graham, William, of Devonshaw, Dollar	1854
	Graham, William, jun., Lairg	1855
	Graham, William Stirling, of Airth, Falkirk	1833

		Admitted
	Grahame, Barron, of Morphie, Edinburgh	1853
	Granger, John, Perth	1861
	Grant, Charles, Hazelbrae, Glen Urquhart	1862
	Grant, Colin Campbell, W.S., London	1859
	Grant, Duncan, of Bught, Inverness	1825
1440	Grant, Francis William, Monymusk, Aberdeen	1858
	Grant, Hay Macdowall, of Arndilly, Craigellachie	1852
	Grant, Rev. James, D.C.L., D.D., Chaplain to the Society	1828
	Grant, James Augustus, of Viewfield, Nairn	1840
	Grant, James Murray, of Glenmorriston, Inverness	1810
	Grant, James, Clashnior, Ballindalloch	1859
	Grant, John, of Kilgraston, Bridge of Earn	1819
	Grant, Captain John, yr. of Glenmoriston, Moy, Forres	1865
	Grant, John, Mains of Pitgaveny, Elgin	1865
	Grant, John, Burnside, Grandtully, Aberfeldy	1860
1450	Grant, John Peter, W.S., Edinburgh	1823
	Grant, Kenneth, Kinnellan, Dingwall	1853
	Grant, Patrick, W.S., Sheriff-Clerk, Inverness	1836
	Grant, Peter, Glassgreen, Elgin	1865
	Grant, Robert, of Kincorth, Forres	1826
	Grant, Robert, of Druminnor, Rhynie	1841
	Grant, Thomas Macpherson, of Craigo, Montrose	1846
	Grant, Walter Colquhoun	1844
	Grant, William, Spittal of Glenshee, Blairgowrie	1861
	Grant, William, Drumdelgie, Huntly	1862
1460	Grant, William, of Elchies, Craigellachie	1833
	Grant, William, Australia	1839
	Grant, W. P., of Rothiemurchus, Aviemore	1821
	Grassick, Charles	1830
	Grassick, John, Houghton, Aberdeen	1829
	Gray, Alexander, Langholm	1859
	Gray, Donald, Corrish, Golspie	1856
	Gray, George, Windyyett, Avonbridge, Falkirk	1857
	Gray, George, Whitemyres, Aberdeen	1858
	Gray, James, Bearside, Stirling	1851
1470	Gray, James, Braehead Mains, Cramond	1861
	Gray, James, West Plean, Bannockburn	1864
	Gray, John, Merchant, Helensburgh	1831
	Gray, John, Faldonside House, Upper Norwood	1848
	Gray, John, Uddingston, Glasgow	1856
	Gray, Patrick, Middle Strath, Falkirk	1854
	Gray, Thomas, Coul, Markinch	1854
	Gray, Thomas, of King's Grange, Dalbeattie	1858

		Admitted
	Gray, William, Southfield, Duddingston, Edinburgh	1849
	Gray, William, Brownrigg, Drem	1855
1480	Green, William, Ruthrie, Craigellachie	1857
	Greenshields, James, Westown, Lesmahagow	1867
	Greenshields, John, of Kerse, Lesmahagow	1829
	Greg, John, Summerhill, Campbeltown	1850
	Gregorson, Angus, Banker, Oban	1851
	Gregory, Alex. Allan, Corn-Merchant, Inverness	1854
	Gregory, Arthur Thomas, of Buchromb, Mortlach	1833
	Greig, George, of Eccles, Coldstream	1863
	Greig, Thomas, of Glencarse, Perth	1852
	Greig, Thomas Watson, of Muirshiels, Paisley	1861
1490	Grey, George A., Millfield Hill, Wooler	1854
	Grierson, James, Brandedleys, Crocketford	1851
	Grierson, James, of Dalgoner, Dunscore	1855
	Grierson, James, Morton Mains, Thornhill	1860
	Grierson, John, of Muirside, Holywood	1860
	Grierson, Joseph, Breoch, Castle-Douglas	1859
	Grierson, Robert, Westmains, Mouswald, Dumfries	1860
	Grierson, William, Torrs, Castle-Douglas	1859
	Grieve, John, Castles, Dalmally	1858
	Grieve, Michael, Kielater, Tyndrum	1859
1500	Grieve, Robert, Glenfalloch, Arrochar	1857
	Grieve, Robert, Mornish, Killin	1857
	Grieve, Walter, Glendevon, Muckhart	1861
	Grieve, William, Branxholm Park, Hawick	1834
	Grieve, William, Skelfhill, Hawick	1854
	Grigor, James D., Wester Alves, Forres	1858
	Grigor, John, Forres Nurseries, Forres	1847
	Grigor, William, of Seabank, Elgin	1865
	Grindlay, Charles, Winchelhaugh, Stirling	1864
	Guild, Andrew, Coulshill, Auchterarder	1861
1510	Gulland, James, Tullygarth, Clackmannan	1851
	Gulston, Allan James, Dirleton, Llangadock	1856
	Gunn, Alexander, Dalemore, Thurso	1850
	Gunn, Alexander, Dornoch	1856
•	Gunn, Charles, 2, Park Circus, Glasgow	1866
	Gunn, Donald, Brahan Cottage, Dingwall	1864
	Gunn, James, Glendu, Golspie	1839
	Gunn, Marcus, Culgower, Golspie	1849
	Guthrie, David, Edinburgh	1850
	Guthrie, David, Banker, Stranraer	1854
1520	Guthrie, George, Rephad, Stranraer	1839
	Guthrie, John, of Guthrie, Forfar	1836
	Guthrie, Robert, Crossburn, Troon	1857
	Gwynne, Alban Thos. Jones, of Monachty, Cardigan	1834

		Admitted
	HAMILTON and BRANDON, His Grace William, Duke of	1865
	†HOME, The Right Hon. Cospatrick, Earl of	1843
	†HADDINGTON, The Right Hon. George, Earl of	1841
	HOPETOUN, The Right Hon. John, Earl of	1853
	HERRIES, The Right Hon. William, Lord	1830
	HALLIBURTON, The Right Hon. Lord John	1844
1530	†HAMILTON, The Right Hon. R. C. Nisbet	1825
	HOPE, Sir Archibald, of Pinkie, Bart.	1832
	HAY, Sir John C. Dalrymple, of Park Place, Bart., M.P.	1848
	HALL, Sir James, of Dunglass, Bart.	1849
	HEPBURN, Sir Thomas Buchan, of Smeaton, Bart.	1837
	Hadden, George, Coburty, Fraserburgh	1858
	Haddon, Alexander, Honeyburn, Hawick	1857
	Hadwen, Sidney, Kildonan Lodge, Golspie	1854
	Hagart, Colonel, Edinburgh	1862
	Hagart, Thomas, of Bantaskine, Falkirk	1826
1540	Haggart, James V., of Glendelvine, Edinburgh	1844
	Haig, Andrew, Meikle Kilmory, Rothsay	1855
	Haig, John, Cameron House, Windygates	1841
	Haig, William, Kincaple, Cupar-Fife	1857
	Hain, David, Balgove, St. Andrews	1861
	Haldane, Robert, Fernielee, Galashiels	1859
	Halkett, James, Auchentender, Forgue	1864
	Halkett, John Craigie, yr. of Cramond	1864
	Hall, Alexander, Straiton, Leuchars, Fife	1861
	Hall, Andrew, Braerich, Golspie	1855
1550	Hall, Henry, Coul, Dornoch	1846
	Hall, John, Scribercross, Golspie	1841
	Hall, Colonel Thomas, of Killean, Tayinloan	1853
	Hallen, J. H. B., Principal of the Edinburgh Veterinary College	1867
	Halliday, Thomas, Rosehall Foundry, Haddington	1865
	Halley, Andrew, Millhole, The Cairnies, Perth	1861
	Hamilton, Daniel	1861
	Hamilton, Hugh, of Pinmore, Girvan	1853
	Hamilton, James, Wallace Bank, Kilmarnock	1865
	Hamilton, John, of Fairholm, Larkhall	1827
1560	Hamilton, John, of Sundrum, Coylton	1839
	Hamilton, John, of Greenbank, Newton Mearns	1846
	Hamilton, John, Longrig, Torthorwald	1860
	Hamilton, John, Monktonhill Farm, Ayr	1864
	Hamilton, John Buchanan, of Leny, Callander	1846
	Hamilton, John G. Carter, of Dalzell, Hamilton	1857
	Hamilton, John G., Hafton House, Dunoon	1858

		Admitted
	Hamilton, J. B., Burnhouse, Carnwath	1865
	Hamilton, Lt.-Col. Ferrier, of Cairnhill, Kilmarnock	1827
	Hamilton, Major Ferrier, yr. of Cairnhill, Edinburgh	1848
1570	Hamilton, Robert, W.S.	1842
	Hamilton, William, Merchant, Glasgow .	1823
	Hamilton, William, Overton, Wishaw	1864
	Hamilton, William C., of Craighlaw, Wigtown	1852
	Hamilton, Wm. F., Callendar, Falkirk	1859
	Hamilton, Rev. Z. M., D.D., Bressay, Shetland	1864
	Handyside, David, Crosshall, Coldstream	1863
	Handyside, William, of Cornhill, Edinburgh	1843
	Hanning, John, Boghead, Mouswald	1861
	Hannam, John, Kirk Deighton, Wetherby	1854
1580	Hannay, John, Corskie Bank, Banff	1858
	Harden, Robert Allan, Edinburgh	1833
	Hardie, George, Australia	1851
	Hardie, Robert, Harrietfield, Kelso	1851
	Hardie, Wm. H., Bo'ness Mains, Linlithgow	1863
	Hare, Steuart Bayley, of Calderhall, Mid-Calder	1849
	Harkness, W. M. J., Granton, Moffat	1864
	Harley, Alexander, Beckenham, London	1860
	Harper, Frank, Dingwall	1853
	Harper, Robert, Edmonston Mains, Liberton	1857
1590	Harris, Richard H., Earnhill, Forres	1864
	Harris, Thomas, Dalmarnoch, Dunkeld	1857
	Harrison, George, Edinburgh	1864
	Harrop, Isaac Worthington, New Zealand	1846
	Harvey, Arthur, Port Natal	1838
	Harvey, C. W., Merchant, Liverpool	1846
	Harvey, George, Whittingham Mains, Prestonkirk	1850
	Harvey, James, Pottertown, Belhelvie	1858
	Harvey, James H., Pitgersie, Foveran, Ellon	1854
	Harvey, John, of Tiningly Park, Yorkshire	1809
1600	Harvey, John Inglis, of Kinnettles, Forfar	1845
	Harvey, Robert, Distiller, Port-Dundas	1838
	Harvey, William James, of Carnousie, Turriff	1851
	Harvie, Rev. William, of Brownlee, Carluke	1852
	Hathorn, John Fletcher, of Castlewigg, Whithorn	1860
	Hay, Alexander, Trochelhill, Fochabers	1864
	Hay, Alexander, Salesman, Perth	1861
	Hay, Colonel A. S. Leith, of Rannes, C.B.	1862
	Hay, Colin, Callumkill, Port-Ellon, Islay	1865
	Hay, Col. Drummond, of Seggieden, Perth	1862
1610	Hay, George William, of Whiterigg, Sudbury	1841
	Hay, Captain James George, of Belton, Dunbar	1862

		Admitted
	Hay, James, Scrabster, Thurso	1862
	Hay, James, Merchant, Leith	1828
	Hay, James, jun., Little Ythsie, Tarves	1858
	Hay, James, Nether Mill of Tillyhilt, Tarves	1855
	Hay, John, of Letham Grange, Arbroath	1834
	Hay, John, Nunraw, Garwald	1859
	Hay, Robert, Reclerich, Ballindalloch	1852
	Hay, Samuel, Manager, Union Bank of Scotland	1846
1620	Hay, William, of Dunse Castle	1819
	Hay, William, of Hopes, Gifford	1835
	Hay, William, of Chapel, Drem	1853
	Hebden, Robert James, of Eday, Kirkwall	1857
	Hector, David, Sheriff of Wigtown and Kirkcudbright	1863
	Hector, Robert, Montrose	1848
	Heddle, J. G., of Melsetter, Kirkwall	1863
	Heggie, Walter, Kirkcaldy	1859
	Henderson, Alexander, Longniddry	1837
	Henderson, Alexander, of Stemster, Thurso	1847
1630	Henderson, Charles, Abbotrule, Bonchester Bridge	1854
	Henderson, Charles J., Corn Merchant, Leith	1847
	Henderson, David, of Abbotrule, Bonchester Bridge	1854
	Henderson, David, of Gattaway, Newburgh	1850
	Henderson, Duncan, M.D. .	1825
	Henderson, George, East Gordon, Kelso	1854
	Henderson, George, Garroch, Troqueer, Dumfries	1860
	Henderson, G. D., Clayhills, Hallyards, Perthshire	1843
	Henderson, James, of Bilbster, Wick	1839
	Henderson, James, Netherraw, Lilliesleaf	1863
1640	Henderson, James, Kelloside, Sanquhar	1860
	Henderson, John, of Park, Glasgow	1838
	Henderson, John, W.S., Banker, Thurso	1839
	Henderson, John, Byres, Haddington	1850
	Henderson, John, Middlethird, Kelso	1854
	Henderson, John, Humbie Mains, Blackshiels	1859
	Henderson, Peter, Paisley	1859
	Henderson, Robert, Lawrencehill, Alloa	1858
	Henderson, Thomas, Chesterhill, Dalkeith	1854
	Henderson, Thomas, Shidlaw, Coldstream	1863
1650	Henderson, William, Craigarnhall, Bridge of Allan	1851
	Henderson, William, Milton, Cupar-Angus	1861
	Hendrie, John, Kirkwood Colliery, Coatbridge	1862
	Hendrie, John, Castle Heather, Inverness	1865
	Hepburn, James, Preston Mains, Prestonkirk	1863
	Hepburn, John, Keithfield, Tarves	1858
	Hepburn, John Buchan	1845

		Admitted
	Hepburn, J. Stewart, of Colquhalzie, Auchterarder	1810
	Hepburn, Wm. Rickart, of Rickarton, Stonehaven	1859
	Heriot, F. L. Maitland, of Ramornie, Sheriff of Forfar	1851
1660	Herriot, James, Leetside, Whitsome, Coldstream	1863
	Herries, Alex. Young, yr. of Spottes, Edinburgh	1853
	Herries, William Young, of Spottes, Edinburgh	1853
	Hewat, Richard, Writer, Castle-Douglas	1857
	Hewetson, James, Auchenbenzie, Thornhill	1862
	Higgins, Robert, Ninewar, Prestonkirk	1863
	Hill, Alex., of Stonywynd, Boarhills, St. Andrews	1861
	Hill, George Gosset, Merchant, London	1823
	Hill, James Lawson, W.S., Edinburgh	1847
	Hill, John, Easter Carlowrie, Cramond	1850
1670	Hill, Lawrence, Writer, Glasgow	1838
	Hill, Robert, Navidale, Helmsdale	1851
	Hill, Robert, W.S., Edinburgh	1865
	Hilson, George, jun., Jedburgh	1863
	Hilton, Henry, of Fairgirth, Dalbeattie	1860
	Hislop, Robert, jun., Prestonpans	1854
	Hobkirk, James, Craiglockhart, Slateford	1862
	Hodgson, Richard, of Carham, Coldstream	1850
	Hog, Thomas A., of Newliston, Kirkliston	1860
	Hogarth, George, Banker, Cupar-Fife	1842
1680	Hogarth, George, Eccles Tofts, Greenlaw	1863
	Hogg, Henry, Symington Mains, Stow	1863
	Hogg, Robert, Rosemay, Penicuik	1859
	Hogg, Thomas, Hillhouse, Coldstream	1854
	Hogg, Thomas, Cakemuir, Ford	1858
	Home, David Milne, of Wedderburn, Coldstream	1836
	Home, Francis, Sheriff-Substitute, Linlithgow	1829
	Home, G. H. M. Binning, of Argaty, Doune	1831
	Home, Lieut.-Col. G. Logan, of Broomhouse, Dunse	1852
	Honeyman, John, Ballamoar, Patrick, Isle of Man	1857
1690	Hood, Archibald, Coal Manager, Whitehill, Lasswade	1858
	Hood, James, Newmains, Prestonkirk	1857
	Hood, John, of Stoneridge, Coldstream	1827
	Hood, John, Townhead, Cockburnspath	1859
	Hood, John, Linross, Kirriemuir	1861
	Hood, Thomas, Coldstream Mains, Coldstream	1854
	Hope, Andrew, Edinburgh	1851
	Hope, George, Fenton Barns, Drem	1848
	Hope, Henry W., of Luffness, Drem	1865
	Hope, James, Duddingston, Edinburgh	1847
1700	Hope, James, of Belmont, W.S., Edinburgh	1848
	Hope, John Henry, South Elphinstone, Tranent	1851

		Admitted
	Hope, William, Edinburgh	1859
	Horn, James, of Pitmedden, Aberdeen	1860
	Horn, John, of Thomanean, Kinross	1847
	Horn, Robert, Advocate, Edinburgh	1851
	Horn, Robert, Roseville, Duddingston, Edinburgh	1861
	Horncastle, Henry, Edwinstowe, Ollerton, Notts	1864
	Horne, Donald, W.S., Edinburgh	1817
	Horne, Major James, of Stirkoke, Wick	1846
1710	Horne, Thomas Elliot Ogilvie, W.S., Edinburgh	1851
	Hornsby, Richard, Grantham	1858
	Horrocks, John	1818
	Horsburgh, Robert, House of Tongue	1841
	Horsburgh, Major William Henry	1824
	Hosack, William, Lochnell, Bonaw	1853
	Hosack, John, Dochcarty, Dingwall	1865
	Houldsworth, Henry, of Coltness, Motherwell	1857
	Houldsworth, Henry, junior, Glasgow	1865
	Houldsworth, John M., Craigforth, Stirling	1865
1720	Houldsworth, Joseph Henry, Glasgow	1857
	Houldsworth, Thomas, of Farnsfield, Notts	1865
	Houldsworth, William, Glasgow	1857
	Houston, John, Geilston, Cardross	1857
	Houstoun, Colonel A., of Clerkington, Haddington	1845
	Houstoun, William, Kintradwell, Golspie	1854
	Howard, James (J. & F. Howard), Bedford	1859
	Howatson, Charles, of Dornel, Auchincleck, Ayr	1865
	Howden, Francis, Falkland Palace, Falkland	1842
	Howden, James, Jeweller, Edinburgh	1827
1730	Howden, John, Seedsman, Inverness	1865
	Howden, John, Overseer, Nether Braco, Perthshire	1864
	Howden, Robert, Boggs, Pencaitland	1850
	Howe, Alexander, W.S., Edinburgh	1854
	Howie, Henry Brown, Detchant, Belford	1863
	Howie, James, Howtle, Coldstream	1863
	Howie, John, Muirhouse, Kilmarnock	1857
	Hoyle, Duncan, London	1855
	Hozier, James, of Mauldslie Castle, Carluke	1822
	Hozier, William Wallace, Tannochside, Bellshill	1862
1740	Hubback, Joseph, Liverpool	1853
	Hubback, Thomas, Sunlawshill, Kelso	1851
	Hudspith, William, Wishaw, Motherwell	1865
	Huggins, W. B., Glasgow	1844
	Hughan, Peter, Cults, Garlieston	1860
	Hughan, Thomas, of Airds	1838
	Huie, James, Durry, Campbeltown	1857

		Admitted
	Hume, M. N. Macdonald, W.S., Edinburgh	1818
	Hume, P. Hallyburton, Lawfield, Cockburnspath	1840
	Hunt, James Alex., of Pittencrieff, Dunfermline	1859
1750	Hunt, James, of Navity, W.S., Edinburgh	1859
	Hunt, Thomas, Thornington, Coldstream	1863
	Hunter, Alexander, St. Colmac, Rothesay	1855
	Hunter, Alexander, Nethershiel, Ratho	1855
	Hunter, David, of Blackness, Dundee	1826
	Hunter, Evan Alan, W.S., Edinburgh	1860
	Hunter, Herbert, of Burnhead, Lockerbie	1861
	Hunter, James	1823
	Hunter, Lt.-Colonel James, of Auchterarder	1823
	Hunter, James (of Glenapp), Coltness, Motherwell	1852
1760	Hunter, James William, of Thurston, Dunbar	1842
	Hunter, John, Oxenford Mains, Ormiston	1842
	Hunter, John, New Banchory, Banchory	1857
	Hunter, John, Dipple, Fochabers	1864
	Hunter, Mathew D., of Antonshill, Coldstream	1863
	Hunter, Richard, Edinburgh	1837
	Hunter, Robert, Sheriff of Bute and Dumbarton	1843
	Hunter, Robert, Dalhousie Chesters, Lasswade	1854
	Hunter, Robert, Edinburgh	1862
	Hunter, William G., Dumfedling, Langholm	1860
1770	Hunter, William, Haugh, Kirkliston	1853
	Hunter, William, Mackribeg, Campbeltown	1857
	Husband, Robert, Gellet, Dunfermline	1859
	Hutchinson, James, Merchant, Glasgow	1838
	Hutchinson, William, of Ruthven, Coldstream	1863
	Hutchison, James, Townhead, Mouswald, Dumfries	1857
	Hutchison, John	1841
	Hutchison, Robert, of Cairngall, Longside	1829
	Hutchison, Robert, Kirkcaldy	1850
	Hutchison, Robert, of Carlowrie, Kirkliston	1858
1780	Hutton, Thomas, St. Cyrus, Montrose	1844
	Hutton, John, Newhall, Crail	1866
	Hyndman, Henry C., of Springside, West Kilbride	1859
	Hyslop, Hamilton D. B., Tower, Sanquhar	1857

INGLIS, The Right Hon. John, Lord Justice-Clerk	1852
INNES, Sir James Milne, of Edingight, Bart.	1838
Imrie, William, Perth	1861
Inch, John, West Mains, Liberton	1855
Inglis, Charles Craigie Halkett, of Cramond	1834

		Admitted
	Inglis, George, Dron, Cupar-Fife	1864
1790	Inglis, Harry Maxwell, of Logan Bank, P.C.S.	1847
	Inglis, Henry, of Torsonce, W.S., Edinburgh	1849
	Inglis, Lieut.-Col. Hugh, of Kingsmills, Inverness	1856
	Inglis, John, Steam Mills, Musselburgh	1860
	Inglis, John, of Redhall, Slateford	1857
	Inglis, John, Spittalton, Gargunnoch	1864
	Inglis, Peter, East Pilton, Edinburgh	1865
	Inglis, William, Roseberry, Gorebridge	1858
	Inkson, Patrick, Berryleys, Keith	1857
	Innes, Alexander, of Raemoir, Banchory	1840
1800	Innes, Alexander Mitchell, of Ayton	1842
	Innes, Cosmo, P.C.S., Edinburgh	1840
	Innes, Frederic S. Bentley, of Thrumster, Thurso	1865
	Innes, William Mitchell, yr. of Ayton	1865
	Innes, George Mitchell, of Bangour, Edinburgh	1847
	Innes, John B., W.S., Edinburgh	1847
	Innes, Thomas, of Learney, Torphins	1846
	Innes, Thos. S. Mitchell, of Phantassie, Prestonkirk	1842
	Innes, Thomas G. Rose, of Netherdale, Turriff	1862
	Ironside, John, Brindy, Whitehouse, Aberdeen	1858
1810	Ironside, William, Clofrickford, Ellon	1859
	Irvine, Alexander Forbes, of Drum, Aberdeen	1845
	Irvine, Rev. A. Robertson, D.D., Blair-Athol	1838
	Irvine, William Stewart, M.D., Pitlochrie	1843
	Irving, John, Carco, Kirkconnel, Sanquhar	1860
	Irving, George Vere, of Newton, Abington	1844
	Irving, John, London	1838
	Irving, William, Barndennoch, Auldgirth, Dumfries	1857

	JERVISWOODE, The Hon. Lord	1831
	JOHNSTONE, The Hon. Henry Butler, of Corehead	1842
1820	JARDINE, Sir William, of Applegarth, Bart.	1823
	JOHNSTONE, Admiral Sir Wm. J. Hope, K.C.B.	1859
	JOHNSTONE, Sir William, of Kirkhill, Edinburgh	1846
	Jack, John S., Carrat, Stirling	1864
	Jack, Michael, Peggy's Mill, Cramond Bridge	1863
	Jack, Samuel, Dreghorn Mains, Colinton	1860
	Jack, Robert, West Craigs, Corstorphine	1854
	Jack, Robert, Dalziel, Motherwell	1855
	Jackson, Edward J., Edinburgh	1863
	Jackson, John, of Amisfield, Dumfries	1859
1830	Jackson, John, Bush, Langholm	1859

		Admitted
	Jaffray, John, Bank Agent, Dunbar	1858
	Jameson, Melville, Solicitor, Perth	1852
	Jamieson, David, Mains of Auchmithie, Arbroath	1858
	Jamieson, George Auldjo, C.A., Edinburgh	1860
	Jamieson, James Fife, Glasgow	1857
	Jamieson, John, of Kingask, St. Andrews	1860
	Jamieson, Richard, Holm, Carsphairn	1861
	Jamieson, Michael J., of Arngomery, Stirling	1865
	Jamieson, William H., Straiton, Liberton	1858
1840	Jardine, Andrew, of Lanrick, Doune	1846
	Jardine, Alexander, yr. of Applegarth, Lockerbie	1850
	Jardine, James, of Larriston, Dryfeholm, Lockerbie	1846
	Jardine, John, of Thorlieshope, New Castleton	1854
	Jardine, Robert, of Balgray, Lockerbie	1860
	Jardine, Robert, of Castlemilk, M.P., Lockerbie	1863
	Jeffrey, John, Glasgow	1857
	Jeffrey, John, of Balsusney, Kirkcaldy	1859
	Jeffray, A. G., Ballindalloch Mills, Balfron	1864
	Jeffray, William Allan, Braehead, Dalswinton	1862
1850	Jobson, William, Buteland, Hexham	1855
	Johnson, George, Springfield, Forres	1857
	Johnston, Alexander, Hailes, Slateford	1852
	Johnston, George, Marlefield, Kelso	1853
	Johnston, James, Capplegill, Moffat	1854
	Johnston, James, Letham Mains, Haddington	1856
	Johnston, James, Huntington, Lauder	1857
	Johnston, John	1833
	Johnston, John, jun., Ballencrieff Mains, Bathgate	1856
	Johnston, John, Mill of Hirn, Banchory	1857
1860	Johnston, John S., Crailinghall, Jedburgh	1853
	Johnston, Robert, Merchant, Aberdeen	1839
	Johnston, Lieut.-Gen., of Carnsalloch, Dumfries	1860
	Johnston, William, of Lathrisk, Falkland	1849
	Johnston, William, Writer, Bathgate	1852
	Johnston, William, Ranachan, Campbeltown	1857
	Johnstone, Alexander, W.S.	1819
	Johnstone, Charles, Mingary, Strontian	1857
	Johnstone, Christopher, Glasgow	1850
	Johnstone, George, M.D., Fincraigs, Cupar	1857
1870	Johnstone, James, Banker, Dumfries	1860
	Johnstone, James, of Alva, Stirling	1828
	Johnstone, James Bell, Holstane, Thornhill	1860
	Johnstone, John A., Archbank, Moffat	1859
	Johnstone, John James Hope, of Annandale	1824
	Johnston, Miss Hope, of Annandale	1865

		Admitted
	Johnstone, Robert, Polmoodie, Moffat	1859
	Johnstone, Thomas, Lochhouse, Moffat	1859
	Johnstone, Walter, Archbank, Moffat	1859
	Jolly, David Leitch, Banker, Perth	1829
1880	Jones, Charles Digby	1862
	Jopp, Alexander, Advocate, Aberdeen	1834
	Jopp, Robert, New Zealand	1858
	Joss, Alexander, Cruichie, Huntly	1865
	Joss, John, Budgate, Cawdor, Nairn	1865
	KELLIE, The Right Hon. Walter, Earl of	1863
	KINNOULL, The Right Hon. George, Earl of	1853
	KINTORE, The Right Hon. Francis, Earl of	1850
	†KINNAIRD, The Right Hon. George, Lord, K.T.	1830
	KINNAIRD, The Hon. Arthur, M.P.	1862
1890	KENNEDY, The Right Hon. T. F., of Dunure	1812
	KINLOCH, The Hon. Lord	1844
	KINLOCH, Sir David, of Gilmerton, Bart.	1828
	Kay, Charles, Earnside, Forres	1858
	Kay, James, Hillhead, Gargunnock	1864
	Kay, John, Softlaw, Kelso	1863
	Kay, Robert, Tuns, Minard, Inveraray	1867
	Kay, William, Viewbank, Lasswade	1863
	Kaye, Robert, of Millbrae, Moodiesburn	1844
	Keir, Andrew T.	1844
1900	Keir, Duncan, Bucklyvie	1864
	Keir, Patrick Small, of Kindrogan, Pitlochry	1837
	Keir, Simon, Burnside, Elgin	1857
	Keir, William, of Whitehaugh, Newcastleton	1859
	Keir, William A., yr. of Kindrogan, Pitlochry	1867
	Keith, Peter, Factor, Barrogill Castle, Thurso	1865
	Kemp, James, Balnagack Petty, Inverness	1857
	Kemp, John, Implement Maker, Stirling	1852
	Kennedy, Donald, Monteagle, Tain	1838
	Kennedy, David, Newlands, Kirkmahoe	1863
1910	Kennedy, Duncan C., of Glenstriven, Innellan	1863
	Kennedy, Henry H., Turner Hall, Ellon	1865
	Kennedy, Capt. Hew F., of Bennane, Girvan	1832
	Kennedy, James, Brandleys, Sanquhar	1859
	Kennedy, James, New Zealand	1850
	Kennedy, John Lawson, of Knocknaling, Dalry	1846
	Kennedy, Robert, Ballechin, Dunkeld	1861
	Kennedy, William, Glasgow	1842
	Kennedy, William, W.S., Edinburgh	1862

		Admitted
	Kennoway, Robert, Burnhead, Lasswade	1860
1920	Ker, E. Martin, of Gateshaw, Morebattle, Kelso	1863
	Ker, Robert, of Auchinraith, Hamilton	1854
	Kerr, Abram, Castlehill, Thornhill	1864
	Kerr, Alexander, of Scroggiehill, Castle-Douglas	1858
	Kerr, Christopher, of Arthurstone, Dundee	1843
	Kerr, Christopher Webster, The Cottage, Dundee	1859
	Kerr, John, Land-Surveyor, Dunse	1853
	Kerr, John, Morton, Mid-Calder	1859
	Kerr, John, Brocklehirst, Mouswald, Dumfries	1860
	Kerr, Robert, of Chapeldonan, Edinburgh	1857
1930	Kerr, Thomas, Whitehill, Sanquhar	1860
	Kerr, William Williamson	1845
	Kerr, William, Wester Causewayend, Mid-Calder	1854
	Kerr, William Scott, of Chatto, Sunlaws, Kelso	1833
	Kidd, Alexander F., National Bank, Burntisland	1865
	Kidd, James, Grange of Barry, Carnoustie	1858
	Kidd, John, Midscryne, Carnoustie	1858
	Kidston, Archibald G., Glasgow	1844
	Kidston, John P., of Cairns, Cambuslang	1850
	Kier, Thomas, Newlands, Falkirk	1864
1940	Kilgour, Robert, jun.	1826
	Kilpatrick, Peter, Balgownie Mains, Culross	1862
	King, David, Roseneath	1864
	King, James, yr. of Campsie, Levernholm, Hurlet	1857
	King, Jas. Foster, of Carnegie Park, Glasgow	1850
	King, John, Braco, Airdrie	1857
	King, John H., of the Lodge, Balerno	1860
	King, William, Manufacturer, Glasgow	1839
	Kininmonth, Peter, Milton, Leuchars	1859
	Kinloch, Alexander, yr. of Gilmerton, Drem	1859
1950	Kinloch, Alexander John, of Park, Aberdeen	1841
	Kinloch, George, of Kinloch, Meigle	1825
	Kinloch, Colonel John, of Kilrie, Kirriemuir	1829
	Kinnear, Charles, of Kinloch, Ladybank	1824
	Kinross, John, Gunnochan, Braco, Perthshire	1864
•	Kirk, John, W.S., Edinburgh	1848
	Kirk, James, Kaimknow, Muckart	1861
	Kirkcaldy, George D.H., of Hearnesbrook, Ireland	1844
	Kirkpatrick, Samuel, West Roucan, Torthorwald	1860
	Kirkwood, Hugh, Killermont, Maryhill, Glasgow	1854
1960	Kirkwood, John, Implement-Maker, Tranent	1854
	Kirkwood, Alexander, Edin., Medalist to the Society	1866
	Knight, Robert, Middleton, Fintray	1858
	Knowles, Thomas, Flesher, Aberdeen	1858

		Admitted
	LEINSTER, His Grace Augustus, Duke of, K.P., Honorary Member	1851
	†LOTHIAN, The Most Noble William, Marquis of	1854
	LAUDERDALE, The Right Hon. Thomas, Earl of	1863
	†LOVAT, The Right Hon. Thomas, Lord, K.T.	1820
	LESLIE, The Hon. George Waldegrave, M.P.	1862
	LOVAT, The Hon. Simon Fraser, Master of	1853
1970	LAUDER, Sir John Dick, of Fountainhall, Bart.	1848
	LOCKHART, Sir Norman Macdonald, of Lee, Bart.	1865
	LOW, General Sir John of Clatto, K.C.B.	1861
	Laidley, J. W., of Seacliffe, North Berwick	1863
	Laing, George, Cornhill, Coldstream	1863
	Laing, John, Glendeuglie, Damhead, Kinross	1856
	Laing, Thomas, Yorkston, Gorebridge	1855
	Laird, David, Belmont Castle, Meigle	1833
	Laird, George W., Denfield, Arbroath	1858
	Lamont, James, of Knockdow, M.P., Innellan	1850
1980	Lamont, John. Edinburgh	1866
	L'Amy, John Ramsay, of Dunkenny, Forfar	1854
	Landale, Andrew, Easthall, Cupar-Fife	1855
	Landale, James, Woodmill, Falkland	1857
	Landale, Thomas, Easter Rhind, Perth	1855
	Lang, Alexander, Botherickfield, Houston	1867
	Lang, Hugh M., of Blackdales, Largs	1849
	Lang, John, Selkirk	1859
	Lang, John, Bield, Gargunnock	1864
	Lang, Robert, Craigvilla, Strone, Dunoon	1857
1990	Lang, William, of Groatholm, Largs	1854
	Langlands, James C., Bewick, Alnwick	1854
	Latham, Patrick R., Knock, Mull, Oban	1857
	Latta, Mathew Rodger, Bankhead, Balerno	1864
	Lauder, Dewar, Kinkell, St. Andrews	1859
	Laurence, George W., Largnean, Haugh of Urr	1860
	Laurie, James, Mitchelston, Stow	1859
	Laurie, John, of Maxwellton, Moniaive	1840
	Laurie, Wm. Kennedy, of Woodhall, Castle-Douglas	1848
	Laurie, Archd. Campbell, of Moss, Killearn	1864
2000	Lawson, Alexander, of Burnturk, Kettle	1853
	Lawson, Alexander, Merchant, Dundee	1843
	Lawson, Alexander, Old Mills, Elgin	1854
	Lawson, Charles, of Borthwick Hall, Edinburgh	1830
	Lawson, Charles, yr. of Borthwick Hall, Edinburgh	1846
	Lawson, Henry Graham, Edinburgh	1859
	Lawson, Thomas, Longhurst Grange, Morpeth	1854
	Lawson, William, Lessendrum, Huntly	1853

		Admitted
	Learmonth, Alexander, North Bank, Bo'ness	1858
	Learmonth, Lieut.-Col. Alexander, of Dean	1860
2010	Learmonth, Thomas, Parkhall, Linlithgow	1824
	Lee, John, Oakwood, Selkirk	1863
	Lees, John, Marvingston, Haddington	1855
	Lees, Richard, Drinkstone, Hawick	1863
	Lees, Robert, of Fens, Leabrae, Galashiels	1861
	Leigh, Rev. Peter, Golborne Park, Lancashire	1823
	Leighton, James, Baldarroch, Banchory	1857
	Leishman, James, of Broomrig, Dollar	1864
	Leishman, Thomas, Meiklewood, Gargunnock	1864
	Leitch, Archd. K., Inchstelly, Forres	1858
2020	Leith, Alexander, of Freefield, Old Rayne	1841
	Lennie, John, Long Newton, Gifford	1857
	Leny, William Macalpine, of Dalswinton, Dumfries	1865
	Leslie, Colonel, of Balquhain, K.H., Keith-Hall	1858
	Leslie, Colonel, yr. of Balquhain, Keith-Hall	1858
	Leslie, George A. Young, of Kininvie, Mortlach	1840
	Leslie, James Thorn, Blairgowrie	1857
	Leslie, James, Boghall, Linlithgow	1863
	Leslie, William, of Warthill, Old Rayne	1848
	Lewis, James, Edinburgh	1863
2030	Liddell, James, Auchtertool House, Kirkcaldy	1843
	Lidderdale, Wm. H., Writer, Castle-Douglas	1864
	Ligertwood, John, Sheriff-Clerk of Aberdeenshire	1858
	Liggertwood, Lewis, Bracklay, Methlic	1858
	Lindsay, Alexander K., of Balmungo, St. Andrews	1841
	Lindsay, Donald, C.A., Edinburgh	1843
	Lindsay, James, New Zealand	1857
	Lindsay, John Mackenzie, W.S., Edinburgh	1846
	Lindsay, John, Thornhill, Stewarton	1865
	Lindsay, Thomas, Hillhouse, Lamington	1857
2040	Lindsay, William, Leith	1854
	Lindsay, William, Stanhope, Stobo, Peebles	1855
	Lithgow, Edward, Bedshiel, Greenlaw, Dunse	1863
	Lithgow, William, Stanmore House, Lanark	1857
	Little, John, Meikleholmside, Moffat	1859
	Livingston, Tho. S. Fenton, of West Quarter, Polmont	1863
	Loch, George, London	1853
	Lochhead, Thomas, Gortanansaig, Innellan	1861
	Lockhart, Allan Eliott, of Borthwick Brae, Hawick	1832
	Lockhart, James Sinclair, of Castlehill	1846
2050	Lockhart, John, Stirling	1849
	Lockhart, Rev. Laurence, D.D., of Milton-Lockhart	1857
	Lockhart, Robert, jun., Glasgow	1866

		Admitted
	Lockie, William, West Morriston, Earlston	1859
	Logan, Alexander, London	1831
	Logan, Andrew, Crossflat, Kilbarchan	1857
	Logan, David, Auchincraw, Ayton	1854
	Longmore, Andrew, Rettie, Banff	1852
	Longmore, John Alexander, W.S., Edinburgh	1837
	Longmore, William, Banker, Keith	1858
2060	Lorimer, John Achrossan, Tigh-na-Bruaich	1865
	Lorimer, Thomas Webster, Belkie, Aberruthven	1843
	Lorimer, William, Rigg, Kirkconnell	1860
	Lovie, Alexander, Nether Boyndlie, Fraserburgh	1857
	Low, James, Berrywell, Dunse	1843
	Low, James, Yonderton, Ellon	1854
	Lowe, Robert, General Agent, Kirkside, Perth	1861
	Lowden, John M., of Cocklick, Clonyards, Dalbeattie	1858
	Lowis, John, of Plean, Stirling	1864
	Lowndes, James, of Arthurlee	1850
2070	Lucas, Robert, Cornton, Bridge of Allan	1864
	Luke, John, of Brownhills, Muircambus, Colinsburgh	1859
	Lumsdaine, Rev. Edwin Sandys, of Blanerne	1837
	Lumsdaine, Stamford R., of Lathallan, Colinsburgh	1862
	Lumsden, David, Pitcairnfield, Perth	1861
	Lumsden, George, Leslie Lodge, Keith-Hall	1850
	Lumsden, George, Glasgow	1857
	Lumsden, James, Braco, Keith	1840
	Lumsden, James, Lord Provost of Glasgow	1844
	Lumsden, John, Learmonth, Coldstream	1854
2080	Lumsden, Colonel Thomas, of Belhelvie, C.B.	1851
	Lumsden, William James, of Balmedie, Belhelvie	1841
	Lyal, Robert, Farmhall, Bridge of Earn	1861
	Lyall, Charles, Old Montrose, Montrose	1850
	Lyall, David, of Gallery, Montrose	1854
	Lyall, Robert, Carcary, Brechin	1850
	Lyell, John, M.D., Newburgh	1859
	Lyell, John, Banker, Newburgh	1861
	Lyell, Thomas, Shielhill, Kirriemuir	1836
	Lyon, James, Burnhaugh, Netherley, Stonehaven	1859

2090	*MONTROSE, His Grace James, Duke of, K.T.	1821
	MORTON, The Right Hon. Sholto, Earl of	1846
	MORAY, The Right Hon. John, Earl of	1824
	†MANSFIELD, The Right Hon. David, Earl of, K.T.	1833
	MINTO, The Right Hon. William, Earl of	1863

		Admitted
	MURRAY, The Right Hon. Lord James	1865
	MELVILLE, Lieut.-General The Right Hon. Henry, Viscount, K.C.B.	1856
	MIDDLETON, The Right Hon. Henry, Lord	1865
	MACKENZIE, The Right Hon. Holt	1833
	M'NEILL, The Right Hon. Duncan, of Colonsay, Lord Justice-General	1833
2100	M'NEILL, The Right Hon. Sir John, G.C.B.	1846
	MAXWELL, The Hon. Marmaduke C., of Terregles	1830
	MAXWELL, The Hon. Henry Constable, of Milnehead	1838
	MENZIES, The Hon. Lady, of Menzies	1839
	MURE, The Hon. Lord	1847
	MANSEL, Sir John, Bart.	1840
	MENZIES, Sir Robert, of Menzies, Bart.	1841
	MURRAY, Sir Patrick Keith, of Ochtertyre, Bart.	1862
	MACKENZIE, Sir William, of Coul, Bart.	1857
	MAXWELL, Sir William, of Monreith, Bart.	1840
2110	MAXWELL, Sir Wm. Stirling, of Polloc, Bart., M.P.	1841
	MAXWELL, Sir John Heron, of Springkell, Bart.	1839
	MONCREIFFE, Sir Thomas, of Moncreiffe, Bart.	1843
	MACKENZIE, Sir Kenneth Smith, of Gairloch, Bart.	1854
	MACKENZIE, Sir Jas. J. Randoll, of Scatwell, Bart.	1838
	MACKENZIE, The Rt. Hon. Lady Anne, of Scatwell	1841
	MURRAY, Sir John Nesbitt, of Philiphaugh, Bart.	1846
	MONTGOMERY, Sir Graham G., of Stanhope, Bart., M.P.	1843
	MAXWELL, Sir William, of Cardoness, Bart.	1841
	MACKENZIE, Sir Alexander Muir, of Delvine, Bart.	1862
2120	MARJORIBANKS, Sir John, of Lees, Bart	1854
	MAITLAND, Sir Alex. C. R. Gibson, of Barnton, Bart.	1847
	MACKENZIE, Sir Evan, of Kilcoy, Bart.	1846
	MENTETH, Sir James Stuart, of Mansfield, Bart.	1857
	MACTAGGART, Sir John, of Ardwell, Bart.	1839
	MATHESON, Sir James, of Lews, Bart., M.P.	1843
	MARJORIBANKS, Sir Dudley Coutts, of Guisachan, Bart., M.P.	1855
•	Macadam, John, Blairover, Drymen	1857
	Macadam, Dr Stevenson, F.R.S.E., Edinburgh	1859
	Macadam, William, Kepculloch, Balfron	1864
2130	Macalister, Alexander, of Loup and Torrisdale	1840
	Macalister, Keith, of Glenbarr, Tarbert	1842
	M'Alister, Robert, Mid Ascog, Rothesay	1855
	Macallan, James, W.S., Edinburgh	1823
	M'Arthur, John, Banker, Inverary	1862
	Macarthur, Major Alexander	1840

		Admitted
	Macarthur, Duncan, New Zealand	1842
	Macarthur, Dr Peter, Australia	1819
	M'Artney, James, Royal Hotel, Dollar	1857
	Macaskill, Donald, of Rhudunan, New Zealand	1840
2140	M'Auslin, J., Kilbridbeg, Cairndow	1853
	MacAndrew, D. M., Merchant, Leith	1854
	MacBey, Peter, Land-Surveyor, Elgin	1854
	M'Bean, Donald, Auchterblair, Carr Bridge	1865
	Macbean, David, of Delmany, Nairnside, Nairn	1865
	Macbraire, James, of Broadmeadows, Berwick	1863
	M'Call, Henry, of Daldowie, Glasgow	1846
	M'Call, Samuel, of Caitloch, Moniaive	1847
	M'Call, Thomas, Merchant, Glasgow	1838
	M'Callum, George Kellie, of Braco, Perthshire	1842
2150	M'Callum, John, Plewlands, Edinburgh	1843
	M'Callum, John, Hosh Distillery, Crieff	1861
	M'Callum, John, Fendoch, Crieff	1864
	M'Candlish, John M'Gregor, W.S., Edinburgh	1859
	M'Caw, Alexander, Ardlochan, Kirkoswald	1851
	M'Chlery, Henry, London	1857
	M'Clean, Alexander H., Auchneel, Stranraer	1851
	MacClelland, George, W.S.	1838
	M'Coll, Donald, Appin House, Appin	1843
	M'Combie, James Boyn, Advocate, Aberdeen	1840
2160	M'Combie, Peter, Farmton of Linturk, Alford	1858
	M'Combie, Robert, Mains of Drumtochty, Auchinblae	1858
	M'Combie, William, of Easter Skene, Skene	1840
	M'Combie, William, Tillyfour, Aberdeen	1847
	M'Connachy, Archibald, Mackremoie, Campbeltown	1857
	M'Connach, Charles, Hopewell, Tarland	1858
	M'Connach, Hugh, Crobhlaw, Alford, Aberdeen	1864
	M'Connel, John, Penrith	1842
	M'Cowan, Robert, Sec. Glasgow Agricul. Society	1856
	M'Craken, John, Drum, NewAbbey, Dumfries	1850
2170	M'Crie, James, Broughton Mains, Garlieston	1860
	M'Creath, Thos., Grain-Merchant, Ayr	1863
	M'Culloch, Alexander, of Glen, Gatehouse of Fleet	1859
	M'Culloch, Walter, of Ardwall, Gatehouse of Fleet	1849
	M'Diarmid, Charles A., Acharn, Killin	1858
	M'Diarmid, D. A., Killiemore, Aros	1858
	Macdonald, Dr Alexander, Prince Edward's Island	1838
	Macdonald, Alexander, Inverness	1841
	Macdonald, Alexander, Balranald, Lochmaddy	1854
	Macdonald, Alexander, jun., Strathmashie, Kingussie	1857
2180	Macdonald, Alexander, Runnagour, Aberfoyle	1857

		Admitted
	Macdonald, Alexander S., Mudale, Lairg	1855
	Macdonald, Alister M‘Ian, of Dalchosnie, Pitlochry	1841
	Macdonald, Angus, Banker, Callander	1857
	Macdonald, Angus, of Glenaladale, Fort-William	1827
	Macdonald, Archibald Burns, of Glencoe, Perth	1855
	Macdonald, Archibald, Islay	1838
	Macdonald, Major Donald, of Ardmore	1822
	Macdonald, Captain Donald, of Isauld, Thurso	1817
	Macdonald, Donald, Weem Hotel, Aberfeldy	1860
2190	Macdonald, D. P., Government Farm, Fort William	1865
	Macdonald, Harry, Banker, Portree	1857
	Macdonald, Hugh P.	1830
	Macdonald, John, of Monachyle, Lochearnhead	1857
	Macdonald, John Robertson, Rodil, Harris	1841
	Macdonald, Peter, Brodick, Arran	1861
	Macdonald, Reginald George, of Clanranald	1807
	Macdonald, Roderick C., of Castle Teirim	1839
	Macdonald, Lt.-Col. William, of Powderhall, Edin.	1813
	Macdonald, Professor William, M.D., St Andrews	1818
2200	Macdonald, William, Glasgow	1844
	Macdonald, William, of Balnakilly, Blairgowrie	1861
	Macdonald, William S., Fairyknowe, Ecclefechan	1860
	Macdonald, William, writer, Elgin	1865
	Macdonald, Wm. Macdonald, of St Martin's, Perth	1844
	Macdonnell, Eneas Ronald, of Morar, Edinburgh	1846
	Macdouall, Colonel James, of Logan, Stranraer	1838
	M‘Douall, James, yr. of Logan, Stranraer	1865
	M‘Dougall, Thomas, Eskmills, Penicuik	1856
	Macdougal, Alexander, Granton Mains, Edinburgh	1847
2210	Macdougall, Allan, W.S.	1829
	M‘Dougall, Arch., Miltown, Ardtalanaig, Kenmore	1860
	M‘Dougall, James, Lylestone, Lauder	1865
	Macdougall, Colin, of Lunga	1808
	Macdougall, Captain James Patrick	1838
	Macdougall, Captain, of Macdougall, R.A., Oban	1865
	Macdougall, John, Kerrytonlia, Rothsay	1853
	Macdowall, Major-Gen., of Garthland, Lochwinnoch	1846
	Macdowall, Henry, Carruith, Bridge of Weir	1845
	M‘Duff, James, Newmill, Stanley	1859
2220	Macewan, James, of Tar of Ruskie, Callander	1834
	M‘Ewan, Alexander	1846
	M‘Ewan, Andrew, South Glen, Dalbeattie	1858
	M‘Ewan, John, Merchant, Glasgow	1850
	M‘Ewen, John, Beannie, Braco, Perthshire	1864
	M‘Ewen, John, Merchant, Stirling	1865

		Admitted
	MacEwen, John C., Moy Hall, Inverness	1865
	MacEwen, Neil M., Blackdub, Stirling	1859
	M'Farlan, John, Faslane, Helensburgh	1851
	Macfarlan, William, of Bencloich	1832
2230	Macfarlane, Alex., Pollanilline, Campbeltown	1857
	Macfarlane, Donald, Auchray, Aberfoyle	1857
	Macfarlane, Donald, Balmuldy, Bishopbriggs	1860
	Macfarlane, Duncan, Torr, Row	1857
	Macfarlane, James, Shielhill, Stanley	1861
	Macfarlane, John, of Muckroy	1821
	Macfarlane, John, of Ballencleroch, Lennoxtown	1857
	Macfarlane, John, Greenfield, Helensburgh	1857
	Macfie, Claud, of Gogarburn, Corstorphine	1862
	Macfie, David J., of Kilmux, Kennoway	1865
2240	Macfie, Robert, of Dreghorn, Liverpool	1864
	Macfie, Samuel, lately at Cressfield, Ecclefechan	1860
	M'Gavin, Robert, of Ballumbie, Dundee	1865
	M'Gibbon, David, Inveravon, Polmont	1863
	M'Gibbon, David, Architect, Edinburgh	1863
	M'Gilivray, William, Ballachroan, Kingussie	1865
	M'Gillewie, Donald, Central Bank, Pitlochry	1867
	M'Gill, James, Torrorie, Kirkbean, Dumfries	1850
	M'Gill, James, Rotchell, Dumfries	1860
	M'Gill, John, Barsalloch, Wigtown	1850
2250	Macgregor, Alexander, London	1837
	Macgregor, Donald Robert, Merchant, Leith	1857
	Macgregor, James, Fort-William	1833
	Macgregor, John, late of Glengyle	1832
	Macgregor, James, of Glengyle, Glasgow	1857
	M'Gregor, James, Balmenoch, Cromdale	1865
	M'Gregor, John, Bellridding, Dumfries	1859
	M'Gregor, John, Tynreich, Dunkeld	1861
	Macgregor, Ronald, W.S., Fort-William	1858
	Macgregor, Thomas, Ord Distillery, Beauly	1865
2260	M'Illraith, James, of Auchenflower, Ballantrae	1835
	MacIndoe, Robert, Merkins, Dumbarton	1864
	M'Inroy, James Patrick, of Lude, Blair-Athole	1831
	M'Inroy, Lieut.-Colonel Wm., of The Burn, Brechin	1827
	M'Intosh, David, of Havering Park, Romford	1864
	M'Intosh, Lieut.-General, of Campsie, K.H.	1852
	M'Innes, Duncan, of Cowden, Comrie	1865
	MacIntyre, Donald, Tenablair, Comrie	1861
	Macintyre, John, Cleugh Farm, Oban	1844
	M'Isaac, John, Dunglass, Campbeltown	1857
2270	M'Iver, Evander, Scourie	1850

		Admitted
	Macivor, John, New South Wales	1827
	Mack, James, Upper-Keith, Blackshiels	1851
	Mack, William, of Berrybank, Reston	1854
	Mackay, Donald, Lythmore, Thurso	1852
	Mackay, George, of Bighouse	1846
	Mackay, John, Soccoth, Dalmally	1857
	Mackay, John Alexander, of Blackcastle, Edinburgh	1857
	M'Kean, Robert, Lumloch, Bishopriggs	1857
	M'Kechnie, Neil, Inverary	1855
2280	Mackechnie, James, Torren, Lochgilphead	1864
	Mackellar, Duncan	1839
	M'Kellar, Neill, Brae Sallich, Ford, Lochgilphead	1862
	Mackenzie, Alexander, Banker, Elgin	1853
	Mackenzie, Alexander, Writer, Forres	1865
	Mackenzie, Alexander, Edinburgh	1846
	Mackenzie, Captain Boyce, Creech, Bonar	1855
	Mackenzie, Daniel, jun., Merchant, Glasgow	1844
	Mackenzie, Donald, Sheriff of Fifeshire	1848
	Mackenzie, Donald, Balnabeen, Dingwall	1855
2290	Mackenzie, Donald, Balguie, Applecross	1858
	Mackenzie, George A., Merchant, Liverpool	1862
	Mackenzie, Hugh, of Dundonnell, Ullapool	1860
	Mackenzie, James, W.S., Edinburgh	1845
	Mackenzie, James Fowler, of Allangrange, Munlochy	1865
	Mackenzie, John, of Glack, Old Meldrum	1835
	Mackenzie, John, Edinburgh	1848
	Mackenzie, John Monro, Wishaw	1853
	Mackenzie, John Ord, of Dolphinton, W.S., Edinburgh	1848
	Mackenzie, John Whitefoord, W.S., Edinburgh	1821
2300	Mackenzie, John, jun., W.S., Edinburgh	1863
	Mackenzie, John, Duchlage, Craigrownie, Roseneath	1865
	Mackenzie, Keith William Stewart, of Seaforth	1846
	Mackenzie, Kenneth, C.A., Auditor of Accounts to the Society	1848
	Mackenzie, Kenneth Francis	1811
	Mackenzie, Kenneth John, Advocate	1845
	Mackenzie, Murdo, Easter Moy, Beauly	1853
	Mackenzie, Robert D., of Caldarvan, Alexandria	1838
	Mackenzie, Roderick, Glack, Aberdeen	1856
	Mackenzie, Roderick J., of Flowerburn, Fortrose	1865
2310	Mackenzie, Thomas, of Ord, Beauly	1846
	Mackenzie, Thomas, Edinburgh	1851
	Mackenzie, Wm., Unthank, Inchture	1852
	Mackenzie, Wm., Ardross, Dingwall	1862
	M'Kerchar, James, Dalchiarlich, Fortingall	1860

		Admitted
	M'Kerral, Archd., Brunerican, Campbeltown	1857
	Mackerrow, Andrew, Beansburn, Kilmarnock	1862
	Mackessack, James, Earnside, Alves, Forres	1865
	M'Kessack, Charles, Culblair, Ardersier	1865
	M'Kessack, John, Balnaferry, Forres	1857
2320	M'Kessack, Robert, of Waterford, Forres	1864
	Mackie, George, of Dunjarg, Castle-Douglas	1860
	Mackie, Ivie, of Auchencairn, Castle-Douglas	1862
	Mackie, James, of Bargaly, M.P., Castle-Douglas	1845
	Mackie, James Logan, Lagavulin, Islay	1864
	Mackie, John, Sarkshields, Kirkpatrick-Fleming	1860
	Mackie, John, Oldtown of Coynach, Mintlaw	1853
	Mackie, John Wyse, Edinburgh	1852
	Mackie, Robert, Loudon, Galston	1857
	Mackinlay, James, Glasgow	1854
2330	Mackinlay, John, Whitehaven	1818
	M'Kinnell, Andrew, Newton Stewart	1860
	Mackinnell, J. B. A., yr. of M'Murdieston, Dumfries	1860
	Mackinnon, Alexander Kenneth, Corry, Broadford	1827
	Mackinnon, Neil, of Demerara	1829
	Mackinnon, William Alexander, of Mackinnon, M.P.	1811
	Mackintosh, Charles F., Solicitor, Inverness	1865
	Mackintosh, Æneas, of Daviot, Inverness	1839
	Mackintosh, Æneas, of Balnespeck, Inverness	1846
	Mackintosh, Æneas W., of Raigmore, Inverness	1844
2340	Mackintosh, Lieut.-Col. Alexander, of Far, Inverness	1839
	Mackintosh, Angus, of Holm, Inverness	1844
	Mackintosh, George, of Geddes, Nairn	1832
	Mackintosh, George Gordon, Balnespeck, Inverness	1846
	Mackintosh, James, of La Mancha, Leadburn	1851
	Mackintosh, Robert T., Seedsman, Edinburgh	1854
	Mackintosh, William, Australia	1813
	Mackintosh, William S., Garlic Hill, Auldearn, Nairn	1865
	M'Kirdy, John Gregory, of Birkwood, Lesmahagow	1850
	M'Knight, Alexander, Burncroft Lodge, Salop	1860
2350	Maclachlan, Alex., Easter Longhaugh, Bishopton	1850
	Maclachlan, George, W.S., Edinburgh	1843
	Maclachlan, Robert, of Maclachlan	1817
	Maclachlan, W. A., of Auchentroig, Balfron	1862
	Maclagan, Douglas, M.D., Professor of Medical Jurisprudence, University of Edinburgh	1853
	Maclagan, Peter, Beechwood, Dunkeld	1847
	M'Lagan, Peter, of Pumpherston, M.P., Mid-Calder	1847
	Maclaine, Hugh, late of Killundine	1847
	Maclanachan, James, Van Diemen's Land	1855

		Admitted
	Maclaren, Donald, Corrychrone, Callander	1859
2360	Maclaren, Duncan, M.P., Newington House, Edinburgh	1853
	Maclaren, D. S., Banker, Fort-William	1858
	Maclaren, Dr John, of Balemenoch, Blairgowrie	1839
	M'Laren, James, Gifford Bank, Haddington	1864
	M'Laren, John, Monzie, Blair-Athole	1859
	M'Laren, John, Millhill, Inchture	1858
	M'Laren, John, Greenhead of Arnit, Kinross	1859
	M'Laren, Joseph, Greenhead of Arnit, Kinross	1859
	M'Laurin, James, Greenhill, Dalbeattie	1858
	Maclean, Alexander, of Ardgour, Bonaw	1856
2370	Maclean, Alexander, of Carsaig, Aros	1835
	Maclean, Colonel Allan Thomas	1835
	Maclean, Archibald D., London	1837
	Maclean, Colin, of Lagan, Islay	1838
	Maclean, Donald, of Boreray	1822
	Maclean, Duncan, Bellnollow, Crieff	1861
	Maclean, George, Hynish, Tyree	1849
	Maclean, Hector Frederick, W.S., Edinburgh	1854
	M'Lean, James, St. Martins, Fortrose	1857
	Maclean, James, Clerk of Supply, Wigtown	1860
2380	M'Lean, Lauchlan, Pitilie, Aberfeldy	1860
	Maclean, Dr. Lachlan, Tobermory	1823
	Maclean, Neil, Land-Surveyor, Inverness	1837
	Maclean, William, of Plantation, Glasgow	1838
	Macleay, Alexander D., Bilbster, Wick	1846
	Macleay, Kenneth, of Keiss, Wick	1839
	M'Lellan, W. H., of Marks, Kirkcudbright	1857
	Maclelland, Thomas, North Balfern, Kirkinner	1857
	MacLennan, Alexander F., Meikle Urchany, Nairn	1865
	MacLennan, Donald, junior, Muirton, Munlochy	1865
2390	Maclennan, Alexander, Ord Distillery, Beauly	1865
	Maclennan, John	1840
	MacLennan, John, Carnock, Strathconon, Beauly	1864
	Macleod, Alexander Norman	1817
	Macleod, Donald, Coulmore, Inverness	1830
	Macleod, Donald, Claggan, Dunvegan	1841
	Macleod, John N., Banker, Kirkcaldy	1849
	Macleod, Norman, of Dalvey, Forres	1839
	Macleod, Norman, of Macleod, London	1839
	Macleod, Robert Bruce Æneas, of Cadboll, Tain	1854
2400	Macleod, Colonel William	1817
	M'Leod, William A., Scorrybreck, Portree	1865
	M'Millan, John, lately at Newton-Stewart	1860
	M'Millan, John Gordon, of Ballinakill, Clachan	1861

		Admitted
	M'Minn, Francis, Edinburgh	1854
	M'Murchy, Donald, Backs, Campbeltown	1857
	M'Murrich, James, of Stuckgown	1852
	M'Murtrie, John, Banker, Ayr	1854
	M'Nab, Alex., of Techmuiry, Glenochil, Stirling	1865
	M'Nab, Duncan, Writer, Stirling	1855
2410	Macnab, James Monro	1837
	Macnaghten, Steuart, of Inver Trosachs, Callander	1855
	M'Nair, James, Smerly, Campbeltown	1857
	MacNair, John, Brewer, Leith	1857
	M'Naughton, Alexander, Remony, Kenmore	1857
	M'Naughton, Alexander, Kerriemore, Fortingal	1859
	Macnaughton, James, of Smithfield, Ayr	1854
	Macnaughton, Alexander, S.S.C., Edinburgh	1866
	Macneale, Hector, of Ugadale, Campbeltown	1848
	M'Neill, Alexander, of Bordland, Noblehouse	1859
2420	M'Neill, Archibald, P.C.S., Edinburgh	1846
	M'Neill, Charles, Lossit, Ballygrant	1861
	M'Neill, Robert, Letter, Killearn	1857
	M'Neill, John Carstairs, of Gigha	1860
	M'Neillie, William, of Castlehill, Dumfries	1861
	M'Nie, William C., Stirling	1859
	M'Niven, Alex., Sheemore, Luss	1857
	M'Noe, John, Flats of Cargen, Dumfries	1860
	M'Onie, John, Auchmour, Drymen	1857
	Maconochie, Robert Blair, W.S., Edinburgh	1852
2430	M'Phail, Alex., America	1857
	Macpherson, Alex., M.D., Lauriston Castle, Cramond	1841
	Macpherson, Allan, London	1822
	Macpherson, Duncan, Banker, Kingussie	1865
	Macpherson, Col. D. E., of Belleville, Kingussie	1865
	Macpherson, Ewan, of Cluny Macpherson, Kingussie	1827
	Macpherson, Hugh, Slafarquhar, Denny	1864
	Macpherson, James, Nuide, Kingussie	1856
	Macpherson, James, Drumore, Croy, Ardersier	1865
	Macpherson, John, Blantyre, Glasgow	1856
2440	Macpherson, J., Lord Chamberlain's Office, London	1857
	Macpherson, John, Killihuntly, Kingussie	1860
	Macpherson, William, of Blairgowrie	1822
	M'Queen, James, of Boquhapple, Monteith	1857
	Macqueen, Robert, of Braxfield, Biggar	1842
	Macqueen, Captain Simon	1820
	Macrae, Archibald, M.D.	1839
	Macrae, Donald, Luskintyre, Harris	1850
	Macrae, Donald, Banker, Kingussie	1863

		Admitted
	Macrae, Captain James A., Vallay, Lochmaddy	1865
2450	Macredie, Pat. Boyle Mure, of Perceton, Irvine	1830
	Macritchie, Thomas Elder, of Craigton, W.S., Edin.	1831
	M'Tavish, Alexander S., Killin	1861
	M'Tavish, Duncan, America	1857
	Mactier, Alexander Walker, of Durris, Aberdeen	1848
	Macvicar, Rev. J. G., D.D., Moffat	1828
	Madden, Henry R, M.D., Brighton	1839
	Main, Alexander James, Pollockshiels, Glasgow	1847
	Maitland, George F., of Hermand, West Calder	1852
	Maitland, James, Scotstown, Insch, Aberdeen	1856
2460	Maitland, James, jun., Little Methlic, Methlic	1858
	Maitland, Rev. James, D.D., Kells, New Galloway	1860
	Maitland, John, of Freuch, Balgreggan, Stranraer	1865
	Maitland, William, Netherton, Insch	1858
	Makgill, George, of Kemback	1841
	Malcolm, John, of Poltalloch, Lochgilphead	1860
	Malcolm, John Wingfield, yr. of Poltalloch, M.P.	1864
	Malcolm, W. E., of Burnfoot, Langholm	1840
	Mangles, George, Givendale, Ripon, Yorkshire	1861
	Mann, John, Glasgow	1847
2470	Mann, John, Meadowfield, Auldearn, Nairn	1865
	Mansfield, Thomas, C.A., Edinburgh	1827
	Marjoribanks, John, Roseneath	1856
	Marjoribanks, William, Merchant, Leith	1854
	Marr, James A., of Alderston, Mid-Calder	1864
	Marr, William Smith, Mill of Tillyhilt, Tarves	1855
	Marshall, George Hunter, of Gartchonzie, Edinburgh	1866
	Marshall, John, Killbreck, Lairg	1847
	Marshall, John, yr. of Curriehill, Edinburgh	1854
	Marshall, Peter, of Townhead, Kilsyth	1867
2480	Marshall, Robert, Gateside, Kirkliston	1850
	Marshall, Thomas, The Howes, Annan	1860
	Martin, Donald, Argyll Cottage, Oban	1858
	Martin, James, Flesher, Aberdeen	1858
	Martin, James Watson, Broomhouse, Corstorphine	1850
	Martin, John, Claggan, Kenmore	1858
	Martin, John, Strathpeffer, Dingwall	1865
	Martin, John M., yr. of Auchendennan, Alexandria	1867
	Martin, Montague J., Mansion House, Greenock	1859
	Martin, Dr. Nicol, of Glendale, Dunvegan	1854
2490	Martin, Samuel Elliott, Seed-merchant, Hull	1865
	Mason, Robert, of Meadowbank, Edinburgh	1859
	Mason, Thomas, Palinsburn Cottage, Coldstream	1854
	Mather, Daniel, Hallrule, Hawick	1863

		Admitted
	Matheson, Alexander, of Ardross, M.P.	1846
	Matheson, Major-General Thomas	1847
	Matthew, William, Kennoway	1862
	Mathews, Niven, Whitehills, Garliestown	1853
	Mathie, James, Banker, Stirling	1864
	Matthew, Alexander, Forret, Cupar Fife	1861
2500	Maxwell, Edward Heron, of Teviotbank, Hawick	1861
	Maxwell, Francis, of Breoch, Dumfries	1841
	Maxwell, Francis, Glasgow	1844
	Maxwell, Francis, of Drumpark, Dumfries	1861
	Maxwell, Francis, of Gribton, Dumfries	1865
	Maxwell, Robert, Bellochgair, Campbeltown	1857
	Maxwell, Wellwood H., of Munches, Dalbeattie	1839
	Maxwell, Wellwood, of The Grove, Dumfries	1858
	May, George, Civil Engineer, Inverness	1839
	Mayne, Robert, Edinburgh	1838
2510	Meall, James, Buttergask, Coupar-Angus	1852
	Mears, William, Commission Agent, Edinburgh	1859
	Meek, George, of Campfield	1814
	Meiklam, John, of Gladswood, Melrose	1857
	Meikle, David, Clunie Mains, Kinglassie	1854
	Meikle, James, Writer, Kilmarnock	1858
	Meikle, James, Blackburn Hall, Bathgate	1854
	Meiklejohn, John, Foundry, Dalkeith	1862
	Mein, Alexander, Woodhead of Cairness, Cortes	1864
	Mein, Andrew Whytock, of Hunthill, Jedburgh	1861
2520	Mein, Benjamin, Roxburgh Barns, Kelso	1863
	Mein, Nicol A., Marsh House, Canonbie	1860
	Mein, Robert, Factor to the Duke of Bedford	1838
	Mein, William, Seedsman, Kelso	1863
	Meldrum, David, of Craigfoodie, Cupar-Fife	1857
	Meldrum, Edward, Chemical Works, Bathgate	1863
	Meldrum, James, Wester Durie, Leven	1860
	Melrose, Jonathan, Newbigging, Coldstream	1854
	Melville, James Moncrieff, W.S., Edinburgh	1848
	Melville, John Whyte, of Bennochy, St. Andrews	1819
2530	Melvin, Charles, Ratho Mains, Ratho	1862
	Melvin, James, Bonnington, Ratho	1849
	Menzies, Andrew, of Balornock, Glasgow	1857
	Menzies, Donald, Carr Bridge	1865
	Menzies, Duncan, Edinburgh	1863
	Menzies, Duncan, Braemore, Lochbroom, Dingwall	1864
	Menzies, Fletcher Norton, Edinburgh, Secretary of the Society	1841
	Menzies, Graham, London	1853

		Admitted
	Menzies, James, Auch, Tyndrum	1857
	Menzies, James A. Robertson, New Zealand	1849
2540	Menzies, John S., of Chesthill, Aberfeldy	1821
	Menzies, Ronald Steuart, of Culdares, Fortingall	1842
	Menzies, William, Auch, Tyndrum	1865
	Mereer, Daniel, Achamore, Dunoon	1861
	Mercer, Græme R., of Gorthy, Perth	1850
	Mercer, John, Ardnadam, Dunoon	1861
	Mercer, Major, of Huntingtower, Perth	1853
	Mercer, R., of Scotsbank, Ramsay Lodge, Portobello	1863
	Merry, James, of Belladrum, M.P., Beauly	1838
	Methven, Thomas, Nurseryman, Edinburgh	1865
2550	Middleton, Charles Stuart, Merchant, Liverpool	1840
	Middleton, George, Cornton, Ferintosh, Dingwall	1864
	Middleton, John, Edinburgh	1863
	Middleton, Robert, Edinburgh	1864
	Middleton, Thomas, Davidston, Cromarty	1865
	Middleton, William, Bridgefoot, Monymusk	1858
	Mill, James, Surgeon, Thurso	1839
	Mill, Robert, Overseer, Balgowan, Perth	1861
	Millar, C. H., Merchant, Montrose	1853
	Millar, James Lawson, Waulkmill, Dunfermline	1852
2560	Millar, James, Mills of Torr, Blairdrummond	1864
	Millar, John, Edinburgh	1848
	Millar, Thomas, West Briggs, Kirkliston	1853
	Millar, Thomas, of Balliliesk, Muckart	1854
	Miller, Captain Alexander Penrose	1843
	Miller, George, of Frankfield, Glasgow	1814
	Miller, George, St. Magdalenes, Perth	1861
	Miller, Hew, Ochtertyre, Crieff	1853
	Miller, John, of Leithen, Edinburgh	1847
	Miller, John, Dounreay, Thurso	1861
2570	Miller, O. G., of Ratho, Edinburgh	1843
	Miller, William, of Manderston, M.P., Leith	1864
	Milligan, James, Hayfield, Thornhill	1855
	Mills, George, Greenend, St. Boswells	1857
	Mills, George, Horsburgh Castle, Peebles	1859
	Mills, Thomas, Horsburgh Castle, Peebles	1863
	Milne, Alexander, Corse of Kinnoir, Huntly	1858
	Milne, Alexander, Mill of Allathan, Udny	1855
	Milne, George, of Kinaldie, Aberdeen	1851
	Milne, George, Haddo, Methlic	1851
2580	Milne, James, Netherton, Fraserburgh	1856
	Milne, James, Pitsligo Castle, Rosehearty	1856
	Milne, James, Balnagubs, Netherley, Stonehaven	1857

		Admitted
	Milne, James	1859
	Milne, James, Cairnhill, Huntly	1862
	Milne, Nicol, of Faldonside, Melrose	1841
	Milne, Nicol, Dryhope, Selkirk	1863
	Milne, Peter, Edinburgh	1861
	Milne, William, Tillycairn, Cluny, Aberdeen	1866
	Mitchell, Alexander, of Sauchrie, Maybole	1851
2590	Mitchell, Alexander, Alloa	1857
	Mitchell, Alex., of Stow, M.P., Carolside, Earlston	1863
	Mitchell, Andrew, Alloa	1848
	Mitchell, David, Burnton, Laurencekirk	1861
	Mitchell, Duncan, Blairvockie, Luss	1857
	Mitchell, Duncan Forbes, of Thainstone, Keith-Hall	1866
	Mitchell, Gilbert, Meikle Haddo, Foveran	1865
	Mitchell, Houston, of Polmood, Peeblesshire	1848
	Mitchell, Hugh, Balligreggan, Campbeltown	1857
	Mitchell, James, Auchenraith, Kirkmahoe, Dumfries	1851
2600	Mitchell, James, Homeston, Campbeltown	1857
	Mitchell, James P., Traprain, Prestonkirk	1855
	Mitchell, James, Banker, Pitlochry	1864
	Mitchell, John, Stronchrigan, Ardgour	1843
	Mitchell, John, Ballemenach, Campbeltown	1850
	Mitchell, John, Flisk Mill, Newburgh	1861
	Mitchell, John, Lordscairnie, Cupar-Fife	1862
	Mitchell, John, Banker, Dingwall	1864
	Mitchell, Joseph, Civil Engineer, Inverness	1836
	Mitchell, Robert, Cadham, Markinch	1852
2610	Mitchell, Robert, Skelpie, Pitlessie	1859
	Mitchell, Samuel, Strath, Campbeltown	1850
	Mitchell, Thomas, Kirkhope, Selkirk	1853
	Mitchell, William, Merchant, Montrose	1862
	Mitchell, William Gillespie, of Carwood, Biggar	1849
	Mitchell, William, Ribigill, Tongue, Lairg	1863
	Mitchelson, Arch. Hepburne, Old Faskally	1832
	Moffat, George, Minard, Inveraray	1861
	Moffat, James, Garwald, Langholm	1850
	Moffat, James, Gateside, Kirkconnel, Sanquhar	1860
2620	Moffat, James, British Linen Bank, Castle Douglas	1867
	Moffat, John, Craik, Hawick	1850
	Moffat, Thomas, Drumbuie, Sanquhar	1862
	Moffat, William, Town-Clerk, Dingwall	1863
	Moffat, William, Shirva, Kirkintilloch	1864
	Moffat, William, Easter Kinleith, Currie	1864
	Moir, Benjamin, Merchant, Aberdeen	1840
	Moir, James, Mains of Wardhouse, Insch	1858

		Admitted
	Moir, John M., of Hillfoot and Milton, Dollar	1834
	Moir, Robert, of Easterton, Tarty, Ellon	1851
2630	Moncrieff, Alexander, W.S., Perth	1842
	Moncrieff, Alexander, of Barnhill, Perth	1852
	Moncrieff, David Scott, W.S., Edinburgh	1866
	Moncrieff, James, Advocate, M.P.	1848
	Moncrieff, Robert Scott, of Fossoway, Dalkeith	1831
	Monro, Alexander Binning, of Auchinbowie, Stirling	1833
	Monro, David, of Allan, Tain	1851
	Monteath, Alexander, of Cauldhame, Stirling	1864
	Monteith, Bryden, Liberton Tower, Edinburgh	1846
	Monteith, Duncan, Belleville Lodge, Edinburgh	1866
2640	Monteith, Robert, of Carstairs	1837
	Montgomery, John H., of Newton	1846
	Moore, John Carrick, of Corsewall, Stranraer	1839
	Moray, Chas. Home Drummond, Abercairny, Crieff	1852
	Morison, Alex., of Bognie, Mountblairy House, Turriff	1850
	Morison, James, Rossie, Dunning	1861
	Morison, James G., Glasgow	1850
	Morison, John B. Brown, of Finderley, Kinross	1862
	Morrison, B. J. Walker, of Fallfield, Largo	1835
	Morrison, Charles, of Islay, Bowmore	1855
2650	Morrison, Harry L.L., Guise, Whitehouse, Aberdeen	1858
	Morrison, James, Glasgow	1850
	Morrison, James, of Livilands, Stirling	1864
	Morrison, John, Burnshot, Linlithgow	1859
	Morrison, William, Cairnie, Forteviot	1861
	Morton, Hugh, Engineer, Edinburgh	1835
	Morton, James, Backbraes, Whithorn	1857
	Morton, John, Lambieletham, St. Andrews	1861
	Morton, John, North Muirton, Perth	1861
	Mosman, Hugh, of Auchtyfardle, Lanark	1859
2660	Mossman, Adam, Edinburgh	1864
	Moubray, John Marshall, W.S., Edinburgh	1843
	Moubray, Robert, Cambus Distillery, Stirling	1862
	Mounsey, J. T., of Kingfield, Longtown, Cumberland	1865
	Muckhart, James, Land Steward, Maybole	1867
	Mudie, John, of Pitmuies, Forfar	1840
	Muir, George W., Caberston, Innerleithen	1852
	Muir, James, Hardington Mains, Wiston, Biggar	1864
	Muir, John	1843
	Muir, John, Lochfergus, Kircudbright	1859
2670	Muir, W. H., S.S.C., Edinburgh	1863
	Muirhead, Claud, Edinburgh	1820
	Muirhead, E. W.	1862

		Admitted
	Muirhead, George, Durdie, Errol	1863
	Muirhead, John James, Edinburgh	1865
	Muirhead, John, Salton Mains, Tranent	1865
	Mundell, David, Auchindrean, Lochbroom	1858
	Munro, Andrew, Balintraid, Invergordon	1864
	Munro, Andrew, of Rockfield, Tain	1865
	Munro, Donald, Stornoway	1857
2680	Munro, Donald, Conchra, Contin, Dingwall	1864
	Munro, John, Fairnington, Kelso	1853
	Murdoch, James, Carntyne, Shettleston	1854
	Murdoch, John Burn, of Gartincaber, Advocate	1853
	Murdoch, Peter, of Langbank, Newton-Mearns	1839
	Murdoch, Robert, Hallside, Cambuslang	1857
	Murdoch, Thomas, Westwood, Blair-Drummond	1864
	Murdoch, William, Huntly	1856
	Mure, Lieut.-Col. William, of Caldwell, Beith	1831
	Mure, William, Kirkcudbright	1841
2690	Murray, Andrew, of Conland	1846
	Murray, Anthony, of Dollerie, W.S., Edinburgh	1828
	Murray, David, Edinburgh	1864
	Murray, Rev. George, of Troquhain, New Galloway	1860
	Murray, George, New Zealand	1854
	Murray, Gilbert B., Chapel Rossan, Stranraer	1865
	Murray, Gilbert, Elvaston Castle, Derby	1867
	Murray, Jack H., Captain R.N.	1843
	Murray, James, Monkland Iron Works, Glasgow	1828
	Murray, James, of Craigend, Drochil Castle, Peebles	1840
2700	Murray, James, East Barns, Dunbar	1850
	Murray, James, Dumfries Arms Hotel, Old Cumnock	1857
	Murray, James, Strathleven, Dumbarton	1861
	Murray, John, Merchant, Laurencekirk	1859
	Murray, John, Grougar Mains, Kilmarnock	1860
	Murray, John L., of Heavyside, Biggar	1862
	Murray, Lieut.-Col. John, of Polmaise, Stirling	1863
	Murray, Dr. John. Kersknow, Kelso	1863
	Murray, John, of Wooplaw, Galashiels	1863
	Murray, Joseph, of Ayton	1820
2710	Murray, Kenneth, Banker, Tain	1851
	Murray, Robert, Spittal, Penicuik	1850
	Murray, Robert, Edinburgh	1858
	Murray, Colonel Samuel Hood, Aberfeldy	1834
	Murray. Thomas, Eastside, Penicuik	1857
	Murray, Thomas Graham, W.S., Edinburgh	1852
	Murray, Walter, Walston, Penicuik	1854
	Murray, William, Kilcoy, Inverness	1856

		Admitted
	Murray, William, Mains of Pittendreigh, Turriff	1858
	Murray, William Hugh, of Geanies, Tain	1846
2720	Murrie, John, Provost of Stirling	1859
	Mustard, Alexander, Davo Mains, Fordoun	1859
	Mutter, John, Wester Melville, Lasswade	1857
	Myers, George Cooper, Town-Clerk, Montrose	1858
	Mylne, Thomas, Niddrie Mains, Liberton	1860
	Mylne, William, Lochhill, Aberlady	1841
	Myles, James, Deanside, Renfrew	1865

	NORTHESK, The Right Hon. William, Earl of	1843
	NAPIER, The Right Hon. Francis, Lord, K.T.	1843
	NAPIER, The Hon. William	1863
2730	NEAVES, The Hon. Lord	1846
	NAPIER, Sir Robert John Milliken, of Milliken, Bart.	1848
	NEPEAN, Sir Molyneux Hyde, of Loders Court, Bart.	1865
	Napier, Dugald, Australia	1857
	Napier, George, Advocate, Sheriff of Peeblesshire	1840
	Napier, Robert, of Shandon, Helensburgh	1844
	Nasmyth, Robert, Edinburgh	1839
	Neilson, James, Rose Hall, Falkirk	1864
	Nelson, Michael, Gallamuir, Stirling	1859
	Newall, John, Mexico	1845
2740	Newton, James Ewan, Linnbank House, Lanark	1838
	Newton, Captain Hay, of Newton, Haddington	1835
	Newton, Robert P., of Castlandhill, Kerse, Falkirk	1837
	Nicholson, Alexander, Writer, Cupar-Fife	1864
	Nicholson, Robert, Lochbank, Dumfries	1861
	Nicol, James Dyce, of Ballogie, M.P., Aberdeen	1853
	Nicol, Alexander, Lord Provost of Aberdeen	1867
	Nicoll, Alexander	1844
	Nicoll, T. Munro, Littleton of Lindertis, Kirriemuir	1867
	Nicolson, Major Allan Macdonald, of Ardmore	1819
2750	Nicolson, J. Badenach, yr. of Glenbervie, Fordoun	1857
	Nicolson, Neil, Ardlamont, Greenock	1857
	Nielson, Andrew, Bank of Scotland, Glasgow	1843
	Nimmo, Matthew, Foot of Green, Stirling	1852
	Nisbet, John, Rumbleton, Greenlaw, Dunse	1854
	Nisbet, Ralph P., Estate Office, Thorney, Peterborough	1865
	Nisbett, John More, of Cairnhill, Drum, Edinburgh	1847
	Niven, Alexander T., C.A., Edinburgh	1860
	Nivison, Thomas, Burn, Thornhill	1852
	Nixon, William, of Lynnwood, Hawick	1865

		Admitted
2760	Noble, John, London	1838
	Noble, William, London	1838
	Norie, Henry Hay, W.S., Perth	1862
	Norman, William, Oughterside, Carlisle	1860
	Normand, James, of Whitehill, Dysart	1861
	Norris, Peter, Todholes, Fintry, Stirling	1867
	OGILVY, The Hon. William, of Loyal, Forfar	1823
	OGILVY, The Hon. William Bruce, of Cowden, Dollar	1862
	ORMIDALE, The Hon. Lord	1854
	OGILVY, Sir John, of Inverquharity, Bart., M.P.	1824
2770	ORDE, Sir John Powlett, of Kilmory, Bart.	1830
	ORR, Sir Andrew, of Harviestoun, Glasgow	1844
	Odams, James, London	1859
	Ogilvie, Archibald, Old Liston, Ratho	1854
	Ogilvie, Captain William, R.N.	1820
	Ogilvie, William, of Chesters, Jedburgh	1809
	Ogilvie, William, Broadhaugh, Hawick	1853
	Ogilvie, George, Holefield, Kelso	1860
	Ogilvy, John, of Inshewan, Forfar	1836
	Ogilvy, John, Harecraig, Dundee	1859
2780	Ogilvy, Peter Wedderburn, of Ruthven, Meigle	1826
	Ogilvy, Thomas, yr. of Ruthven, Meigle	1844
	Ogilvy, Thomas, of Corrimony, Inverness	1838
	Ogston, Alexander, of Ardoe, Aberdeen	1840
	Oliver, Andrew, South Fallowknowe, Coldingham	1863
	Oliver, James, Howpasley, Hawick	1850
	Oliver, James, Bridge House, Hawick	1852
	Oliver. Robert, of Blakelaw, Kelso	1853
	Oliver, Thomas, Redheughs, Corstorphine	1856
	Oliver, W. Elliot, Glenforsa, Mull	1858
2790	Oliver, William, of Langlaw, Bonchester Bridge	1863
	Ord, John, of Muirhouselaw, Nisbet, Kelso	1841
	Orde, John William Powlett, younger of Kilmory	1858
	Ormiston, William T., of Glenburn Hall, Jedburgh	1848
	Oswald, Alexander Haldane, of Auchincruive, Ayr	1845
	Oswald, James Townsend, of Dunnikier, Kirkcaldy	1848
	Otto, William Ellison, Factor, Newbattle, Dalkeith	1863
	Ovens, Thomas, Merchant, Galashiels	1851
	†POLWARTH, The Right Hon. Henry, Lord	1829
	POLWARTH, The Hon. Walter Scott, Master of	1863

		Admitted
2800	POLLOK, Sir Hugh Crawford, of Pollok, Bart.	1846
	PRINGLE, Sir John, of Newhall, Bart.	1810
	PATTON, The Right Hon. George, of Cairnies, Lord Advocate	1843
	Pagan, Allan Cunningham, Invergeldie, Comrie	1852
	Pagan, Samuel A., M.D., Edinburgh	1848
	Pagan, William, of Clayton, Cupar-Fife	1845
	Park, Alexander B., Woodend, Kelso	1863
	Park, James	1859
	Park, James, Stoneyhill, Musselburgh	1863
	Park, Thomas B., Haddington	1866
2810	Park, Thomas, Stoneyhill, Musselburgh	1854
	Park, William, of Blegbie, Melrose	1849
	Parker, John, Nether Broomlands, Irvine	1857
	Parks, Samuel, London	1817
	Parnell, Dr. Richard, Gattonside, Melrose	1867
	Pate, Thomas, South Draffan, Lesmahagow	1857
	Paterson, Alexander, Wine-Merchant, Leith	1840
	Paterson, Alexander, Mains of Mulben, Keith	1853
	Paterson, Alexander, Carmacoup, Douglas	1860
	Paterson, Archibald, Meadowfield, Corstorphine	1848
2820	Paterson, David	1857
	Paterson, D. A., Merchant, Leith	1854
	Paterson, George, of Castle Huntly	1841
	Paterson, James, Whitehouse, Lamlash	1853
	Paterson, James, of Longbedholm, Moffat	1860
	Paterson, James W., Craigend, Dumfries	1861
	Paterson, James, Chapelhill, Hawick	1862
	Paterson, James E., Linlathen, Broughty-Ferry	1862
	Paterson, John, junior	1847
	Paterson, John, Macoriston, Doune	1852
2830	Paterson, John, Skirling Mains, Biggar	1857
	Paterson, John, Ewingston, Gifford	1860
	Paterson, John, Eastfield, Penicuik	1860
	Paterson, John, Howcleuch, Moffat	1862
	Paterson, J. W., Terrona, Langholm	1854
	Paterson, Robert, of Birthwood, Biggar	1848
	Paterson, Robert, of Brocklehirst, Dumfries	1835
	Paterson, Walter, Merchant, Glasgow	1851
	Paterson, William, Twiglees, Lockerbie	1851
	Paterson, William, of Ettrickhall, Selkirk	1863
2840	Paterson, William, West Wattin, Golspie	1865
	Patison, John, W.S., Edinburgh	1846
	Paton, Alexander, Macnairston, Ayr	1857
	Paton, Daniel, Francesfield, Logiealmond	1864

		Admitted
	Paton, John, Balbedie, Lochgelly	1859
	Paton, John, of Crailing, Jedburgh	1833
	Paton, John, of Grandholm, Aberdeen	1841
	Patrick, James, of Kilmun, Argyleshire	1865
	Patterson, John, Middleton, Dollar	1850
	Patterson, Robert, Stirling	1851
2850	Pattison, A. Dunn, of Dalmuir, Glasgow	1864
	Pattullo, George, Keillor, Cupar-Angus	1861
	Pattullo, Peter, Eassie Farm, Glammis	1861
	Paul, Rev. John, D.D., Edinburgh	1839
	Paul, William, Advocate, Aberdeen	1855
	Paul, William, Kinflat, Forres	1855
	Payne, James, Carruchan, Dumfries	1860
	Peake, John, Craigend, Stow	1857
	Pearson, Andrew A., of Springfield, Carluke	1854
	Pearson, David A., of North Cliff, Queensferry	1863
2860	Peat, George, Banker, Dunse	1865
	Peat, John, Manor, Stirling	1858
	Pelham, C. Thursby, Etteridge, Kingussie	1864
	Pender, George, Dumbreck, Kilsyth	1857
	Pender, John Menzies, Auchindawe, Fort-William	1865
	Penman, John, Bonally, Colinton	1859
	Penny, Thomas, Bartlehill, Coldstream	1863
	Peter, Charles, Canterland, Marykirk	1854
	Peter, John, Croyard, Beauly	1854
	Peter, John, of Over Possil, Glasgow	1862
2870	Peter, Robert, Banker, Aberfeldy	1849
	Philip, George, Boynds, Keith Hall	1856
	Philip, John, Polton Mains, Lasswade	1851
	Philip, Robert, Leith	1844
	Philip, William, Lofthillock, Keith Hall	1858
	Phillips, Hugh, Cracrop, Stapleton, Carlisle	1860
	Phillips, John, Laighpark, Milngavie	1854
	Phillips, John Douglas, St. Colme, Aberdour	1862
	Philp, Robert, Bridge of Allan	1864
	Phin, John, S.S.C., Edinburgh	1863
2880	Picken, Jas., Laigh Langside, Craigie, Kilmarnock	1857
	Picken, James H., of Hillhouse Lodge, Fenwick	1857
	Picken, John, Mansfield Mains, New Cumnock	1857
	Picken, Robert, Burnkirk, Newton-Stewart	1860
	Pierson, James Alexander, of The Guynd, Arbroath	1863
	Pirie, James, Orchardton, Udny	1855
	Pitcairn, John, of Pitcullo, Cupar	1841
	Pitcairn, John, Kinnaird, Newburgh	1863
	Pitcairn, William, of Cunnoquhie, Cupar-Fife	1861

		Admitted
	Pitman, Frederick, W.S., Edinburgh	1859
2890	Pittendrigh, Alexander, Glaslaw, New Pitsligo	1858
	Pittendrigh, Alexander, Newseat, Fraserburgh	1859
	Pittendrigh, John, Bodychell, Fraserburgh	1857
	Platt, William Wright, of Kirkennan, Dalbeattie	1866
	Playfair, Dr Lyon, C.B., Professor of Chemistry, University of Edinburgh	1859
	Plenderleith, Archibald, Moorfoot, Gorebridge	1859
	Plummer, Charles Scott, of Sunderland Hall, Selkirk	1842
	Plummer, George Hay, Melville, Dalkeith	1850
	Plummer, John, Edinburgh	1860
	Pollexfen, James R., of Cairston, W.S., Edinburgh	1841
2900	Pollok, Allan, of Faside, Newton Mearns	1844
	Pollok, Arthur, of Lochlibo, Broom, Newton Mearns	1815
	Ponton, George, Woolston, Linlithgow	1852
	Pople, John B., Birnam Hotel, Dunkeld	1861
	Porteous, Alexander, of Lauriston, Montrose	1851
	Porter, James, Monymusk, Aberdeen	1855
	Porter, John Thos. Brown, Lincoln	1859
	Pott, Gideon, of Knowsouth, Jedburgh	1854
	Potts, Andrew, Lewinshope, Selkirk	1863
	Powrie, Archibald, Lairwell, Perth	1861
2910	Powrie, James, of Reswallie, Forfar	1849
	Prentice, George, of Strathore, Kirkcaldy	1855
	Prentice, George, junior, Balmuto, Kirkcaldy	1864
	Prentice, Robert R., Pitteadie, Kirkcaldy	1865
	Primrose, James, Turniedykes, Ford	1855
	Primrose, James Thomson, Sauchland, Ford	1863
	Pringle, Alexander, of Whytbank, Selkirk	1859
	Pringle, David, of Wilton Lodge, Hawick	1863
	Pringle, David, Hyndlee, Bonchester Bridge	1863
	Pringle, James Hall, of Dirrie, Cleethaugh, Jedburgh	1863
2920	Pringle, James Thomas, of Torwoodlee, Selkirk	1863
	Pringle, John, Agricultural Implement Agent, Edin.	1863
	Pringle, John, Garvald, Gorebridge	1865
	Pringle, Robert K., The Grove, Darly Dale, Matlock	1852
	Pringle, Robert Oliphant, Edinburgh	1866
	Proudfoot, John, Pinkiehill, Musselburgh	1848
	Pullar, John, junior, Keirfield, Bridge of Allan	1864
	Punton, Francis H., West Fortune, Drem	1865
	Purdie, Thomas, Edinburgh	1856
	Purves, Andrew, Pressmenan, Stenton	1860
2930	Purves, Charles, Lugton, Dalkeith	1855
	Purves, George, Elemscleugh, Innerwick	1853
	Purves, James, Thurdistoft, Thurso	1839

		Admitted
	Purves, James, junior, Lochend, Dunnet, Thurso	1861
	Purves, William, Burnfoot, Kelso	1859
	Purvis, John, of Kinaldy, St. Andrews	1844
	Purvis, John, Balbirnie Mill, Markinch	1851

	RICHMOND and LENNOX, His Grace Charles, Duke of, K.G.	1840
	*ROXBURGHE, His Grace James, Duke of, K.T.	1837
	†ROSEBERRY, The Right Hon. Arch., Earl of, K.T.	1806
2940	ROSSLYN, The Right Hon. Francis, Earl of	1857
	ROLLO, The Right Hon. John, Lord	1857
	RICHARDSON, Sir John Stewart, of Pitfour, Bart.	1823
	RIDDELL, Sir Thomas Miles, of Sunart, Bart.	1845
	RADCLIFFE, Sir Joseph, of Millsbridge, Bart.	1820
	RUSSELL, Sir William, of Charlton, Bart.	1853
	Rae, Alexander, Invergowrie, Dundee	1862
	Rae, William, Gateslack, Thornhill	1860
	Raiker, James, Mountrich, Dingwall	1865
	Rainy, Dr Alexander, Aberdeen	1858
2950	Rainy, George, of Rasay, Broadford	1846
	Rait, D. C., Goldsmith, Glasgow	1838
	Rait, James, of Anniston, Arbroath	1854
	Ramsay, John, of Kildalton, Bowmore	1856
	Ramsay, Major John, of Barra, Aberdeen	1856
	Ramsay, Robert B Wardlaw, of Whitehill, Lasswade	1841
	Ramsay, Captain, Paxton House, Berwick	1854
	Ramsay, Maj.-Gen. W. Maule, Dalhousie Castle	1861
	Ramsay, Rear-Admiral Wm., C.B., Edinburgh	1864
	Ranken, George, Australia	1839
2960	Ranken, Patrick, of Mavisbank, Glasgow	1844
	Ranken, Thomas, S.S.C., Edinburgh	1838
	Ranken, William, M.D., Glenlogan, Sorn	1836
	Rankin, George, Union Bank, Aberfeldy	1866
	Rankine, John, of Beoch, Lochlands, Maybole	1857
	Rankine, W. J. Macquorn, LL.D., Professor of Engineering, University of Glasgow, Consulting Engineer to the Society	1865
	Rannie, Henry A., Mill of Boyndie, Banff	1859
	Rannie, Mordaunt Gordon, Edenmouth, Kelso	1859
	Rashleigh, William, of Menabilly, Fowey	1837
	Rattray, Lieut.-Col. J. C., of Craighall, Blairgowrie	1854
2970	Rawdin, Joseph, Chemist, Jedburgh	1856
	Ray, William, Sunbank, Elgin	1854

		Admitted
	Rea, Charles, Doddington, Wooler	1863
	Redfern, W. Macquarrie, London	1857
	Reed, Ellerington, Kilcalmkill, Golspie	1847
	Reed, Robert, Balnakyle, Lairg	1847
	Reekie, Andrew, Walton, Auchtertool, Fife	1864
	Reid, Alexander, Cruivie, Cupar	1857
	Reid, Benjamin L., Balcairn, Old Meldrum	1855
	Reid, Charles G., W.S.	1844
2980	Reid, George, Seedsman, Aberdeen	1858
	Reid, James, Ballencrieff, Drem	1855
	Reid, James, Cattle-Dealer, Biggar	1857
	Reid, James, Donavourd, Dunkeld	1861
	Reid, John, Hilton of Aldie, Kinross	1859
	Reid, Patrick, Cattle-Dealer, Middleton, Gorebridge	1854
	Reid, Peter, Drumfork House, Helensburgh	1855
	Reid, Peter, Nether Kildrummy, Mossat	1858
	Reid, Walter, Drem	1850
	Reid, Walter, Park of Keir, Dunblane	1864
2990	Reid, William, of Hayston, Kirkintilloch	1857
	Rennie, James, Kessington, East Kilpatrick	1857
	Reoch, John F., of Gilmerton, Edinburgh	1759
	Rhind, David, Architect, Edinburgh	1852
	Richardson, David, of Hartfield, Glasgow	1863
	Richardson, Francis, Merchant, Edinburgh	1849
	Richardson, James, Merchant, Edinburgh	1833
	Richardson, James T. Stewart, yr. of Pitfour, Perth	1861
	Richardson, John, Writer, Haddington	1851
	Richardson, John, Drylawhill, Prestonkirk	1863
3000	Richardson, Robert, Merchant, Edinburgh	1837
	Richardson, Robert, Haddington	1859
	Richardson, Robert, Crailingnook, Jedburgh	1863
	Richardson, Thomas, of Ralston, Glasgow	1854
	Richmond, George, Lawhill, Auchterarder	1861
	Richmond, John, Dron, Perth	1861
	Richmond, Matthew, Cararie, Ballantrae	1857
	Rickman, Thomas	1831
	Riddell, David, Kilbowie, Duntocher	1863
	Riddell, Thomas, Oxnam Nook, Jedburgh	1854
3010	Riddell, Wm., Hundalee, Jedburgh	1852
	Riddell, William, Rink, Selkirk	1863
	Riddick, George, Greenhill-head, Lockerbie	1859
	Rigg, William, Banks, Kirkcudbright	1861
	Rintoul, Charles, East Craigie, Cramond	1852
	Rintoul, David, Upper Cairnie, Forteviot	1861
	Rintoul, Robert, Lawhill, Largo	1865

		Admitted
	Ritchie, Charles, Piershill, Edinburgh	1865
	Ritchie, James, Edinburgh	1863
	Ritchie, John, Newbigging Mains, Carnwath	1857
3020	Ritchie, Robert, Civil Engineer, Edinburgh	1833
	Ritchie, Thomas, Forrest Mill, Clackmannan	1838
	Ritchie, William, Nether Liberton, Edinburgh	1853
	Ritchie, William, Plean Mill, Stirling	1852
	Ritchie, William, of Middleton, Gorebridge	1865
	Robb, James, Gorgie, Slateford	1849
	Robb, James, Edinburgh	1862
	Roberton, Andrew, Hoselawbank, Kelso	1863
	Roberton, James, Ladyrig, Kelso	1841
	Roberton, John, Harperton, Kelso	1854
3030	Roberton, John, junior, Harperton, Kelso	1863
	Roberton, Robert, Ladyrig, Kelso	1863
	Robertson, Alexander, W.S., London	1825
	Robertson, Alexander F., Ardlaw, Fraserburgh	1856
	Robertson, Alexander Inglis, Aultnaskiach	1839
	Robertson, Andrew, M.D., Indego, Tarland	1832
	Robertson, Arthur John, Inverness	1840
	Robertson, Dr. Charles, Auchtercairn, Gairloch	1860
	Robertson, Daniel, Friarton, Perth	1861
	Robertson, David, of Ladykirk, M.P., Berwick	1842
3040	Robertson, David, Aberdeen	1847
	Robertson, David, Cloag, Methven	1861
	Robertson, David Souter, of Whitehill, Edinburgh	1847
	Robertson, Donald, of Pencross, Edinburgh	1854
	Robertson, Duncan Graham, of Torrie, Callander	1864
	Robertson, Captain George A.	1817
	Robertson, George B., Whitkirk, Prestonkirk	1860
	Robertson, James, Woodend, Cathcart	1857
	Robertson, James, Inverary	1836
	Robertson, James, Hall of Caldwell, Beith	1852
3050	Robertson, James, Denbrae, Cupar-Fife	1859
	Robertson, Jas Stewart, of Edradynate, W.S, Edin.	1851
	Robertson, Captain John	1825
	Robertson, John, Banker, Huntly	1847
	Robertson, John, Australia	1855
	Robertson, John, of Gartloch, Glasgow	1856
	Robertson, John, Glencripidale, Strontian	1854
	Robertson, John, S.S.C., Edinburgh	1859
	Robertson, John, Old Blair, Blair-Athole	1864
	Robertson, John, Drynie Mains, North Kessock	1865
3060	Robertson, John, of Blairbeth, New Hall Factory, Glasgow	1865

		Admitted
	Robertson, John, Bellaty, Glenisla, Alyth	1867
	Robertson, Lawrence, Royal Bank, Edinburgh	1828
	Robertson, Neil, Frenich, Aberfoyle	1857
	Robertson, Peter S., Trinity Nurseries, Edinburgh	1862
	Robertson, Maj.-Gen. Richardson, of Tullybelton, C.B.	1847
	Robertson, Stewart Souter, Hatton Bank, Hamilton	1861
	Robertson, Thomas W., Perth	1865
	Robertson, Wilfred Mason, of Gartloch, Moodiesburn	1859
	Robertson, William, of Kinlochmoidart, Strontian	1826
3070	Robertson, William, Cuttlebrae, Fochabers	1857
	Robertson, William, V.S., Kelso	1863
	Robeson, Robert, Springwells, Coldstream	1863
	Robey, Robert, Engineer, Lincoln	1859
	Robinow, Adolph, Merchant, Leith	1851
	Robson, Charles, Lurdenlaw, Kelso	1841
	Robson, Charles, junior, Lurdenlaw, Kelso	1863
	Robson, John, Byreness, Otterburn	1853
	Robson, Neil, C.E., Glasgow	1857
	Rodger, David, Penkiln, Garlieston	1851
3080	Rodger, George, Bridgelands, Selkirk	1861
	Rodger, Matthew, of Rossland, Glasgow	1854
	Rodger, Peter, Selkirk	1859
	Rodger, Robert, Hadlow Castle, Tunbridge	1838
	Rodger, Robert M., Factor, Airdrie House, Airdrie	1865
	Roger, Hugh, Attiquin, Maybole	1857
	Roger, William, Wester Pitlour, Strathmiglo	1865
	Rogers, James S., Rose Mill, Dundee	1862
	Rogerson, George, Piersby Hall, Lockerbie	1851
	Rogerson, James, yr. of Wamphray, Lockerbie	1864
3090	Rogerson, William, of Gillesbie, Lockerbie	1829
	Rolland, Adam, of Gask	1837
	Ronaldson, Alexander, Glasgow	1857
	Ronaldson, Alexander, Little Gight, Methlic	1863
	Romanes, Robert, of Harryburn, Lauder	1863
	Rome, R. M., Ruggetshaws, Langholm	1860
	Rose, James, Mains of Connage, Inverness	1865
	Rose, John, Kirktown, Inverness	1865
	Rose, John N., of Holme, Croy, Ardersier	1865
	Rose, Major James, of Kilravoch, Nairn	1865
3100	Rose, William, Sheriffston, Elgin	1854
	Ross, Alexander, Inchley, Banchory	1857
	Ross, David, Banker, Dingwall	1864
	Ross, D. G., Seed Merchant, Dingwall	1864
	Ross, George, of Pitcalnie, Parkhill	1839
	Ross, George, Tore Farm, Munlochy	1865

		Admitted
	Ross, Lieut.-Col. George W. H., of Cromarty	1849
	Ross, James, Newton-lees, Kelso	1863
	Ross, Major-General James K., K.H., Edinburgh	1839
	Ross, Harry, junior, Wester Coull, Tarland	1858
3110	Ross, John Leith, of Arnage, Ellon	1843
	Ross, Richard Louthian, of Staffold	1804
	Ross, Thomas, Bachilton, Perth	1856
	Ross, William, Greenside, Largo	1859
	Roughead, David, Seedsman, Haddington	1850
	Rowan, John Martin, Atlas Works, Glasgow	1857
	Rowat, Thomas, Edinburgh	1855
	Roy, Alexander, Waterton, Insch, Aberdeen	1856
	Roy, Frederick Lewis, of Nenthorn, Kelso	1837
	Roy, James, junior, Seedsman, Aberdeen	1840
3120	Roy, Robert, W.S., Chester	1822
	Royds, Robert Whyt	1856
	Ruddock, Joseph Willis, Tweed House, Berwick	1863
	Russell, Alexander James, W.S., Edinburgh	1846
	Russell, Andrew Walker, of Kenlygreen, Newburgh	1854
	Russell, David, Silverburn, Leven	1859
	Russell, Francis Whitworth	1835
	Russell, George E., Edinburgh	1858
	Russell, James, of Aden, Mintlaw	1834
	Russell, James, Edinburgh	1848
3130	Russell, James, Coalstoun Mains, Haddington	1851
	Russell, James, of Breckonside, Thornhill	1847
	Russell, John, Saughton Hall Mains, Slateford	1862
	Russell, Lewis, Conon, Dingwall	1864
	Russell, Robert, Edinburgh	1834
	Russell, Robert, Pilmuir, Leven	1851
	Rust, James, Paddocklaw, Banff	1858
	Rutherford, George, Monteath's Houses, Gorebridge	1860
	Rutherford, George, of Scaurs, Jedburgh	1863
	Rutherford, George, Printonan, Coldstream	1863
3140	Rutherford, John, Eldinhope, Selkirk	1863
	Rutherford, John, Muirhall, Perth	1861
	Rutherfurd, Wm. Oliver, of Edgerston, Jedburgh	1825
	Rutherfurd, Wm. A. Oliver, yr. of Edgerston	1863
	Ruxton, Andrew, South Artrochie, Ellon	1854
	Ruxton, John, M.D., Hill of Fiddes, Hill of Menie	1851
	Ruxton, William, Farnell, Brechin	1850

†SUTHERLAND, His Grace George, Duke of, K.G.	1849
SUTHERLAND, Her Grace Harriet, Dowager Duchess of	1834

		Admitted
	STRATHMORE, The Right Hon. Thomas, Earl of	1852
3150	†SELKIRK, The Right Hon. Dunbar-James, Earl of	1830
	SOUTHESK, The Right Hon. James, Earl of	1850
	†SEAFIELD, The Right Hon. John, Earl of	1842
	STAIR, The Right Hon. John, Earl of	1845
	SCOTT, The Right Hon. Lord Henry, M.P.	1861
	SCOTT, The Right Hon. Lord Walter	1861
	SCOTT, The Right Hon. Lord Charles	1864
	†STRATHALLAN, The Right Hon. William, Viscount	1847
	STORMONT, The Right Hon. William, Viscount	1861
	SALTOUN, The Right Hon. Alexander, Lord	1854
3160	SANDILANDS, The Hon. James, Barnton	1855
	SINCLAIR, Sir Robert Charles, of Stevenson, Bart.	1864
	STEWART, Sir M. R. Shaw, of Blackhall, Bart.	1848
	SCOTT, Sir William, of Ancrum, Bart., M.P.	1829
	STEWART, Sir Wm. Drummond, of Grandtully, Bart.	1839
	SETON, Sir William Coote, of Pitmedden, Bart.	1834
	SIMPSON, Sir James Y., Bart., Professor of Midwifery, University of Edinburgh	1848
	SINCLAIR, Sir George, of Ulbster, Bart.	1812
	SUTTIE, Sir George Grant, of Balgone, Bart.	1839
	SINCLAIR, Sir John, of Dunbeath, Bart.	1824
3170	STEUART, Sir Henry M. Seton, of Allanton, Bart.	1835
	STEWART, Admiral Sir Houston, K.C.B.	1822
	Sadler, Daniel B., Balmuick, Crieff	1864
	Sadler, Thomas, Norton Mains, Ratho	1838
	Sadler, William, Ferrygate, Drem	1853
	Salmon, James, Benston, Johnstone	1858
	Salmon, John, Johnstone Castle, Johnstone	1856
	Salmond, Duncan, Rothsay	1846
	Salmond, James, Cairnie, Arbroath	1858
	Salmond, Robert, Banker, Glasgow	1845
3180	Sanderson, Capt. A. C., of Glenlaggan, Castle-Douglas	1844
	Sanderson, James, 10, Pall Mall East, London	1854
	Sanderson, Wm., Corstorphine Bank, Corstorphine	1864
	Sands, William John, W.S., Edinburgh	1849
	Sangster, Robert B., Banker, Golspie	1845
	Scarth, James, Banker, Leeds	1820
	Scarth, Pillans, W.S., Leith	1862
	Scarth, Robert, of Binscarth, Kirkwall	1843
	Scobie, John, Lochinver, Golspie	1851
	Scoon, Kenneth, Braidwood, Gorebridge	1854
3190	Scott, Adam, Dalmore, Alness	1851
	Scott, Alexander, Beanston, Prestonkirk	1850
	Scott, Alexander, Hopetoun, South Queensferry	1860

		Admitted
	Scott, Andrew, Glendouglas, Jedburgh	1848
	Scott, Cartaret G., of Malleny, Balerno	1842
	Scott, Charles, Palmerton, Cockburnspath	1857
	Scott, Charles, Corn Merchant, Arbroath	1859
	Scott, Charles C., of Hawkhill, Greenock	1831
	Scott, David	1823
	Scott, David, 3, Craigo Street, Montrose	1859
3200	Scott, David, Meadowfield, Duddingston, Edinburgh	1849
	Scott, D. G. C., Parks of Inches, Inverness	1866
	Scott, Admiral George, of Wooden, Kelso	1844
	Scott, Lieutenant-Colonel George	1821
	Scott, George, Mosstower, Kelso	1863
	Scott, Gideon James, Singlee, Selkirk	1861
	Scott, Henry, Crosslee, Selkirk	1853
	Scott, Hercules, of Brotherton, Bervie	1859
	Scott, Hugh, of Gala, Galashiels	1846
	Scott, James, of Kelly, Glasgow	1850
3210	Scott, James, Easter Tullo, Stonehaven	1862
	Scott, James, Enzieholm, Langholm	1859
	Scott, James, Fitzmaurice, of Commieston	1843
	Scott, Dr. James Robson, of Ashtrees, Yetholm	1863
	Scott, James R. Hope, of Abbotsford, Melrose	1854
	Scott, John, Agrl. Commission Agent, Belford	1862
	Scott, John, Finnart House, Greenock	1826
	Scott, John, of Rodno, W.S., Edinburgh	1842
	Scott, John Scott Elliot, Buckholm, Galashiels	1863
	Scott, Captain Robert	1841
3220	Scott, Robert, Kinninghall, Hawick	1863
	Scott, Thomas, Easter Cadder, Kirkintilloch	1857
	Scott, Thomas, of Uddingston, Glasgow	1857
	Scott, Thomas, Whitton, Morebattle, Kelso	1863
	Scott, Thomas Robson, of Newton, Jedburgh	1860
	Scott, Walter, Glendronach, Huntly	1850
	Scott, Walter, Edgerston Tofts, Jedburgh	1863
	Scott, William, Timpendean, Jedburgh	1857
	Scott, William, Wester Rora, Mintlaw	1855
	Scott, William, Mossilee, Galashiels	1855
3230	Scott, William, of Burnside, Alyth	1862
	Scott, William, Howford, Selkirk	1863
	Scott, William, North Leys, Banchory-Ternan	1857
	Scott, William Elliot, of Peel, Newcastleton	1863
	Scott, William Monteath, yr. of Ancrum, Jedburgh	1863
	Selby, Ephraim, Hassendean, Hawick	1863
	Sellar, Patrick Plenderleith, Hartfield, Tain	1849
	Sempill, John	1857

		Admitted
	Semple, Thomas, Mull	1857
	Seton, Alexander, of Preston, Linlithgow	1854
3240	Seton, George, Advocate, Edinburgh	1848
	Seton, Henry, V.S., Edinburgh	1859
	Shand, Alex. Burns, Sheriff of Kincardineshire	1863
	Shand, John, W.S., Edinburgh	1844
	Shand, George, Stirling	1864
	Shand, William, Crichton, Ford	1864
	Sharp, Andrew, North Forr, Crieff	1861
	Sharp, Francis, Doverhall, Inverkeithing	1858
	Sharp, James	1846
	Shaw, Charles, W.S., Sheriff Substitute, Lochmaddy	1835
3250	Shaw, David, W.S., Ayr	1836
	Shaw, Harry, Bogfairn, Tarland	1850
	Shaw, James, Skaithmuir, Coldstream	1863
	Shaw, Patrick, Advocate, Sheriff of Chancery	1835
	Shaw, Thomas, Forter, Glenisla, Alyth	1861
	Shaw, William, Finegaud, Glenshee, Blairgowrie	1861
	Shawe, R. F., of Bartinghame, Thorpe, Hull	1838
	Shennan, James, Balig, Kirkcudbright	1857
	Shepherd, George, Shethin, Tarves	1854
	Shepherd, George, jun., Craigies, Tarves	1865
3260	Shepherd, Captain Thomas, of Kirkville, Skene	1858
	Shiels, George, Horsupcleuch, Dunse	1866
	Shireff, Charles, Dunfermline	1829
	Shireff, John Bell, Carronvale, Larbert ·	1864
	Shirreff, Charles H., Corn Factor, Edinburgh	1859
	Shirreff, Thomas, West Barns, Dunbar	1861
	Shirreff, David, Muirton, Drem	1847
	Shirreff, Samuel D., Saltcoats, Drem	1850
	Shortreed, Robert, Attonburn, Yetholm	1854
	Sidey, James, Pitcairngreen, Perth	1852
3270	Sim, Adam, of Culter Mains, Biggar	1836
	Sim, Alexander, Fawells, Keith-Hall	1866
	Sim, William, Edinburgh	1858
	Simpson, Alexander, Seafield, Inverness	1846
	Simpson, Alex. Horatio, Hayes, Uxbridge	1830
	Simpson, Alexander, Clerk of Supply, Dumfries	1860
	Simpson, Alexander, Wallyford, Musselburgh	1860
	Simpson, George, Bedrule, Jedburgh	1853
	Simpson, James, Mawcarse, Kinross	1851
	Simpson, Richard, Haggerston, Beal, Northumberland	1863
3280	Simpson, Robert, of Cobairdy, Huntly	1839
	Simson, Charles, of Threepwood, Lauder	1850
	Simson, George, of Pitcorthie, Leven	1841

		Admitted
	Simson, George, Courthill, Kelso	1861
	Simson, Thomas, Blainslie, Lauder	1850
	Sinclair, Alexander, Edinburgh	1839
	Sinclair, Archibald, Glasgow	1859
	Sinclair, David, Loirston, Aberdeen	1863
	Sinclair, Dugald, Kilchamaig, Tarbert	1826
	Sinclair, James, of Forss, Thurso	1830
3290	Sinclair, James, Westmill, Inchture	1858
	Sinclair, John, Borlum, Glen Urquhart	1856
	Sinclair, J. G. T., yr. of Ulbster, Thurso	1857
	Sinton, Thomas, Aberarder, Laggan	1863
	Sivewright, James	1850
	Skene, Moncrieff, of Pitlour, Strathmiglo	1849
	Skene, William F., W.S., Edinburgh	1831
	Skinner, Captain C. G. M'Gregor, Malone, Belfast	1823
	Skinner, James, Drumin, Ballindalloch	1827
	Skinner, James, Woodside, Aberdeen	1859
3300	Skinner, John, Balwhimry, Markinch	1858
	Skirving, Adam, of Croys, Dalbeattie	1857
	Skirving, James, Luffness Mains, Drem	1850
	Skirving, Robert Scot, Camptoun, Drem	1846
	Sleigh, John, Land-Surveyor, Strichen	1858
	Slipper, Robert B., Stamford Hill, London	1863
	Sloan, David, Coach Builder, Dumfries	1861
	Small, David, Writer, Dundee	1843
	Small, James, of Dirnanean, Blairgowrie	1859
	Small, Lindsay, Bellevue, Coupar-Angus	1857
3310	Small, Patrick, of Brewlands, Blairgowrie	1867
	Small, William, Merchant, Dundee	1843
	Smart, James, Liberton Park, Edinburgh	1864
	Smart, John, Glasgowego, Blackburn, Aberdeen	1858
	Smith, Adam, Stevenson Mains, Haddington	1857
	Smith, Alexander, Civil Engineer, Aberdeen	1847
	Smith, Alexander (A. & W. Smith & Co.), Glasgow	1852
	Smith, Alexander, Letham, Berwick	1863
	Smith, Alexander P., Munlochy Farm, Munlochy	1864
	Smith, Andrew, Willowbrae House, Edinburgh	1862
3320	Smith, Andrew, Castle Mains, Douglas	1856
	Smith, Andrew, Solicitor, Dingwall	1864
	Smith, Archibald, Sheriff-Substitute, Glasgow	1838
	Smith, Charles, Whittingham, Prestonkirk	1853
	Smith, Charles Hope Johnstone, Garden Architect	1836
	Smith, David, W.S., Edinburgh	1833
	Smith, David, Easter Ballindean, Inchture	1862
	Smith, E. B., of Blackwood House, Ecclefechan	1839

		Admitted
	Smith, Frederick Charles, Hoprig, Cockburnspath	1864
	Smith, George, Minmore, Ballindalloch	1839
3330	Smith, George Campbell, Australia	1837
	Smith, George, Glasgow	1862
	Smith, Major Hope, of Cruicksfield, Dunse	1853
	Smith, Hugh (Smith Brothers & Co.), Glasgow	1857
	Smith, James, Chemical Works, Auchterarder	1855
	Smith, James, of Olrig, Thurso	1855
	Smith, James, Phoine, Campbeltown	1857
	Smith, James, New Prestwick, Ayr	1857
	Smith, James, Edinburgh	1857
	Smith, James, Glasgow	1859
3340	Smith, John, Advocate, Aberdeen	1851
	Smith, John, Ballochantay, Campbeltown	1857
	Smith, John, Coynachie, Gartly	1858
	Smith, John, Inverallan, Grantown	1865
	Smith, John Gordon, Nevie, Ballindalloch	1852
	Smith, John T., Goswick, Berwick-on-Tweed	1854
	Smith, Richard, Wester Rossland, Bishopton	1864
	Smith, Robert, S.S.C., Edinburgh	1839
	Smith, Robert, Ladyland, Dumfries	1850
	Smith, Robert, Hayford Mills, Stirling	1864
3350	Smith, R. M., Merchant, Leith	1854
	Smith, Thomas, Dalfibble, Dumfries	1850
	Smith, William, Kirkuewton	1823
	Smith, William, Cattle Salesman, Edinburgh	1854
	Smith, William, East Learmonth, Coldstream	1854
	Smith, William, West Drums, Brechin	1856
	Smith, William, Buckie	1857
	Smith, William, Hillford, Monymusk	1858
	Smith, William, Banker, Moniaive	1860
	Smith, William, Stone of Morphie, Montrose	1863
3360	Smollet, Alexander, of Bonhill, Dumbarton	1826
	Smythe, William, of Methven, Perth	1846
	Snodgrass, Allan, Mollandu, Cardross	1857
	Snowdowne, James, Longriggs, Tillicoultry	1858
	Somervail, Peter, Glendevon, Linlithgow	1857
	Somervell, Graham, of Sorn, Mauchline	1857
	Somerville, James, Ladyurd, Noblehouse	1848
	Somerville, James, S.S.C., Edinburgh	1858
	Somerville, James, North Kinkell, Auchterarder	1862
	Somerville, John, Dovecot, Leadburn	1859
3370	Somerville, Samuel, of Ampherlaw, M.D., Edinburgh	1841
	Somerville, S. H. M., of Broadfield, Port Glasgow	1845
	Somerville, Thomas, of Greenfield, Carnwath	1845

		Admitted
	Somerville, William. Merchant, Glasgow	1850
	Souter, Alexander, Banff	1854
	Spears, William R., Writer, Kirkcaldy	1865
	Speid, James, of Forneth, Brechin	1843
	Speir, Robert, Blair Park, Dalry, Ayrshire	1858
	Speir, Thomas, of Blackston, Paisley	1838
	Speirs, Archibald A., of Elderslie, M.P., Renfrew	1865
3380	Speirs, Thomas Dundas, Burnfoot, Houston	1838
	Spence, Adam White, Merchant, Leith	1860
	Spens, Archibald, of Lethallan, Fakirk	1861
	Spens, Nathaniel, of Craigsanquhar, Cupar-Fife	1848
	Spens, William, Glasgow	1845
	Spowart, Thomas, of Broomhead, Dunfermline	1863
	Sprot, James, of Spot, Dunbar	1830
	Sprot, John, Ayr	1830
	Sprot, Mark, of Garnkirk, Glasgow	1826
	Sprot, Mark, of Riddell, Lilliesleaf	1830
3390	Sprot, Thomas, W.S., Edinburgh	1826
	Stables, William Alexander, Cawdor Castle, Nairn	1836
	Starforth, John, Architect, Edinburgh	1854
	Stark, Andrew, Hill of Beath, Crossgates	1858
	Stark, Ralph, Camelon, Falkirk	1862
	Stark, William, Contentibus, Mid-Calder	1861
	Stedman, James, Wester Ulston, Jedburgh	1851
	Steedman, James, Boghall, Roslin	1847
	Steedman, John, Charleston, Dunfermline	1862
	Steel, Christopher, Auchenfranco, Dumfries	1860
3400	Steel, William Bowden, Annathill, Airdrie	1858
	Steele, Robert, Greenock	1853
	Steele, William, Sheriff-Substitute of Dumbarton	1828
	Stegmann, Conrad, Merchant, Leith	1854
	Stenhouse, George, West Pilton, Blackhall	1850
	Stenhouse, James, Southfield, Corstorphine	1850
	Stenhouse, James, yr. of Northfod, Cowden Beath	1852
	Stenhouse, James, Myles, Tranent	1861
	Stephen, James, Conglass, Keith-hall	1858
	Stephen, William, Inchbroom, Elgin	1853
3410	Stephens, Henry, Redbrae Cottage, Edinburgh	1826
	Steuart, Andrew, of Auchluncart, Keith	1845
	Steuart, Archibald Seton, Alloa	1835
	Steuart, David, of Steuart Hall, Stirling	1857
	Steuart, James, W.S., Edinburgh	1842
	Steuart, James, junior, Edinburgh	1864
	Steuart, John, Pollockshaws	1857
	Steuart, Patrick, Middlegill, Moffat	1859

		Admitted
	Steuart, Robert, of Carfin, Edinburgh	1833
	Steuart, Robert, yr. of Carfin, Edinburgh	1864
3420	Steuart, Robert, Brownlee, Carluke	1855
	Steuart, William, London	1833
	Stevens, Moses, of Bellahouston, Glasgow	1832
	Stevenson, Alexander, Banker, Langholm	1839
	Stevenson, Andrew, Duncanlaw, Gifford	1855
	Stevenson, Charles, Edinburgh	1850
	Stevenson, David, C.E., Edinburgh	1853
	Stevenson, Duncan, Edinburgh	1824
	Stevenson, John, Oban	1842
	Stevenson, John B., New Zealand	1853
3430	Stevenson, John, Hillhead, Sorn, Mauchline	1864
	Stevenson, Robert, China	1860
	Stevenson, Thomas, Mount-Lothian, Penicuik	1852
	Stewart, Alexander, Tempar, Kinloch Rannoch	1860
	Stewart, Alexander J., W.S., Edinburgh	1858
	Stewart, Alexander, Craigenseat, Huntly	1862
	Stewart, Alexander, Bog of Cawdor, Nairn	1865
	Stewart, Andrew, Auctioneer, Dumfries	1860
	Stewart, Archibald, Inspector-General of Army Hospitals, Craigruie, Balquhidder	1865
	Stewart, Charles, Kerrowmore, Aberfeldy	1834
3440	Stewart, Charles, of Hillside, Lockerbie	1823
	Stewart, Charles, Solicitor, Inverness	1840
	Stewart, Charles, Tighnduin, Killin	1858
	Stewart, David, London	1842
	Stewart, David, Kippenross, Dumblane	1862
	Stewart, Donald, Clachan, Blair-Athole	1859
	Stewart, Lieutenant Duncan, R.N.	1863
	Stewart, George, Kirkchrist, Kirkcudbright	1844
	Stewart, Henry, of St. Fort, Newport	1837
	Stewart, Henry Black, of Balnakeilly, Pitlochry	1838
3450	Stewart, H. G. Murray, of Broughton, Gatehouse	1857
	Stewart, James, Pitskelly, St. Martins, Perth	1851
	Stewart, James, New Market, Aberdeen	1854
	Stewart, James, Heathfield, Irvine	1858
	Stewart, James, Ballyorgan, Ardrishaig	1857
	Stewart, John, London	1819
	Stewart, John, of Dalguise, Dunkeld	1823
	Stewart, John, M.D., R.N., of Findynate, Logierait	1839
	Stewart, John, of Nateby Hall, Lancashire	1851
	Stewart, John, Strathaven	1854
3460	Stewart, John, Upper Ardroscadale, Rothesay	1855
	Stewart, John, Floddigary, Portree	1852

		Admitted
	Stewart, John Lorn, of Coll, Campbeltown	1824
	Stewart, John Archibald Shaw, London	1853
	Stewart, Malcolm, Fife Keith, Keith	1862
	Stewart, Mark S., of Southwick, Dumfries	1837
	Stewart, Neil P., Baillid, Kingussie	1863
	Stewart, Osmond de Haviland, Waterhead, Lockerbie	1859
	Stewart, Peter, Cowburn, Lockerbie	1860
	Stewart, Major Robert, of Ballechin, Dunkeld	1854
3470	Stewart, Robert, of Ingliston, Kirkliston	1858
	Stewart, Robert Balfour, yr. of St. Fort, Newport	1859
	Stewart, Rob. H. Johnstone, of Physgill, Whithorn	1846
	Stewart, Samuel, Sandhole, Strichen	1857
	Stewart, Thomas, Gillenbie, Lockerbie	1859
	Stewart, Walter, Mains of Kynachan, Pitlochry	1859
	Stewart, William, Ballaterach, Ballater	1829
	Stewart, William, of Blackhouse, Largs	1844
	Stewart, William, Tonroich, Campbeltown	1850
	Stewart, William, Pininver, Campbeltown	1857
3480	Stewart, William, Saddler, Aberfeldy	1860
	Stirling, Gilbert, 9th Lancers, Larbert, Falkirk	1864
	Stirling, Major Graham, of Craigbarnet, Strathblane	1857
	Stirling, James, C.E., Edinburgh	1852
	Stirling, James, of Garden, Kippen	1867
	Stirling, John, of Kippendavie, Dunblane	1833
	Stirling, Captain John, of Gargunnock, Stirling	1865
	Stirling, Thomas Graham, of Strowan, Crieff	1839
	Stirling, William, of Tarduff, Linlithgow	1855
	Stobo, Andrew, Poterstown, Thornhill	1867
3490	Stobo, Robert, of Hallidayhill, Auldgirth Bridge	1860
	Stodart, Archibald, Covington, Biggar	1855
	Stodart, David, Jerviswood Mains, Lanark	1855
	Stodart, George Tweedie, of Oliver, W.S., Edin.	1839
	Stodart, James, Walston. Carnwath	1855
	Stodart, John, Bangour, Uphall	1851
	Stodart, Thomas, Boreland, Lockerbie	1864
	Stodart, William, Wintonhill, Tranent	1855
	Storrie, Francis, V.S., East Linton	1850
	Stott, Gibson, London	1832
3500	Stott, Joseph Hood, Edinburgh	1859
	Strachan, James, Wester Fowlis, Alford	1858
	Strachan, Lewis, Cluny of Raemoir, Banchory	1858
	Strang, John, High Crewburn, Strathaven	1857
	Straton, George Thomas, of Kirkside, Montrose	1842
	Strong, Thomas, W.S., Edinburgh	1859
	Struthers, Dr. John, Prof. of Anatomy, Aberdeen	1859

		Admitted
	Stuart, Alexander C., of Eaglescairnie, Haddington	1863
	Stuart, Alexander, of Inchbreck, Kincardineshire	1865
	Stuart, Captain John	1809
3510	Stuart, Gilbert, Runningbuan, Stitchel, Kelso	1863
	Stuart, James, Aldich, Ballindalloch	1865
	Sturrock, John, Banker, Dundee	1843
	Sutherland, Eric, Tannochie House, Fochabers	1853
	Sutherland, George, of Forse, Lybster	1849
	Sutherland, Joseph, Shiness, Lairg	1856
	Sutherland, Neil, Kilbagie, Kincardine-on-Forth	1864
	Sutherland, Robert, Shiness, Lairg	1856
	Sutherland, Sinclair, Ballifeary, Inverness	1852
	Suttie, James, Shotover Park, Oxford	1855
3520	Swan, Alexander, Merchant, Kirkcaldy	1865
	Swan, James, Live Stock Agent, Edinburgh	1858
	Swan, John, Cattle Salesman, Edinburgh	1851
	Swan, P. D., Provost of Kirkcaldy	1865
	Swan, Robert, Writer, Kelso	1852
	Swan, Samuel, Overton, Bush, Jedburgh	1863
	Swan, Thomas, Live Stock Agent, Edinburgh	1858
	Swann, James, Collierhall, Douglas	1861
	Swann, J. R., Leith Walk, Edinburgh	1859
	Swanwick, Russell, Whittington, Chesterfield	1865
3530	Swinburne, Capt., R.N., of Elian Shona, Greenock	1857
	Swinton, Arch. Campbell, yr. of Kimmerghame	1841
	Swinton, John Campbell, Kimmerghame, Dunse	1810
	Swinton, Peter Burn, Holyn Bank, Gifford	1862
	Sydserff, Thomas Buchan, of Ruchlaw, Prestonkirk	1853
	Syme, George, Couston, Aberdour	1859
	Syme, James, Professor of Clinical Surgery, University of Edinburgh	1838
	Syme, William, Craigie, Leuchars	1857
	Symington, Thomas	1848

	†TWEEDDALE, Most Noble George, Marquis of, K.T.	1809
3540	TORPHICHEN, The Right Hon. Robert, Lord	1831
	THRIEPLAND, Sir Patrick Murray, of Fingask, Bart.	1824
	Tait, Alexander D., of Milrig, Galston	1845
	Tait, James, Banker, Kelso	1846
	Tait, James, Smailholm Mains, Kelso	1858
	Tait, James Campbell, W.S., Edinburgh	1866
	Tait, John, Sheriff of Perthshire	1834
	Tait, John, Langrig, Whitsome	1861

		Admitted
	Tait, Joseph, Lindean, Selkirk	1863
	Tait, Joseph, Brankanentham, Portsoy	1852
3550	Tait, Robert, Leesmill, Coldstream	1863
	Tait, William, Vencheon, Kelso	1863
	Tait, William Reid, Heathfield, Thurso	1862
	Tawse, John, W.S., Edinburgh	1862
	Tawse, John Wardrope, W.S., Edinburgh	1859
	Tayler, William James, of Glenbarry, Rothiemay	1858
	Taylor, Alexander, Hillhouse, Lauder	1863
	Taylor, George, of Kirtonhill, Montrose	1858
	Taylor, John B., Seton West Mains, Prestonpans	1858
	Taylor, Malcolm, Letter Farm, Cove, Greenock	1853
3560	Taylor, John, Redcastle, Arbroath	1861
	Taylor, Robert Laggan, Campbeltown	1857
	Taylor, Robert, Dumfrenny, Banchory	1857
	Templeton, Robert, Rannachan, Campbeltown	1857
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	Tennant, Charles J., St. Rollox, Glasgow	1838
	Tennant, John, St. Rollox, Glasgow	1833
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	Thomas, Robert, Manure Manufacturer, Newtyle	1861
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	Thoms, Patrick Hunter, of Aberlemno, Dundee	1861
	Thomson, Alexander, of Banchory, Aberdeen	1821
	Thomson, Alexander, Banker, Greenock	1825
	Thomson, Alexander, Bar, Haugh of Urr	1858
	Thomson, Alexander, W.S., Tillicoultry	1838
3580	Thomson, Andrew, of Mainhill, St. Boswells	1867
	Thomson, George, of Burnhouse, Stow	1836
	Thomson, George	1854
	Thomson, George, Hopton, Jedburgh	1863
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	Thomson, James, Holmes, Broxburn	1858
	Thomson, James, of Acrehead, Dumfries	1861
	Thomson, John Anstruther, of Charleton, Colinsburgh	1848
	Thomson, John Comrie, Sheriff-Substitute of Aberdeenshire	1867
3590	Thomson, Peter, Cowcoch, Abergele, North Wales	1859
	Thomson, Robert, Seggie, Guard Bridge	1857

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	Thomson, Robert, Nether Cassock, Langholm	1859
	Thomson, R. J., Grange, Kilmarnock	1864
	Thomson, Samuel, Blaiket, Crocketford, Dumfries	1859
	Thomson, Thomas, Merchant, Glasgow	1850
	Thomson, William Thomas, Edinburgh	1841
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	Thomson, William, Grain-Merchant, Edinburgh	1854
	Thomson, William, (Hill & Thomson), Edinburgh	1860
3600	Thomson, William, Burnbank, Blair-Drummond	1861
	Thomson, W. H., Sheriff-Substitute, Inverness	1866
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